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# Instructor Certification Materials and Observation Instruments for Dragon Weapon Training

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# INSTRUCTOR CERTIFICATION MATERIALS AND OBSERVATION INSTRUMENTS FOR DRAGON WEAPON TRAINING

## EXECUTIVE SUMMARY

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### Requirement:

The purpose of the experiment was to evaluate the feasibility of a weapons instructor certification program. A Dragon instructor certification program was developed and its effectiveness evaluated. The report includes the instructor training materials and tests, as well as the observation forms used to document instructor and student performance.

### Procedure:

Two classes of one station unit training (OSUT) students and Dragon instructors were observed during a 2-week period to establish baseline performance measures. Instructors, including four new Dragon instructors assigned for the experiment, received newly developed instructor certification materials and were certified. After certification, two additional OSUT classes were observed, and the same student and instructor measures recorded.

Certification training and testing materials were developed for five of the ten tasks taught during OSUT Dragon training. The five other tasks were used as control tasks. The materials focused on improving the instructor's ability to convey subject matter, as well as the ability to identify student errors, diagnose the reasons for the errors, and provide appropriate corrective feedback. The instructor observation forms documented the degree to which instructors adhered to the principles of instruction stressed during certification, as well as factors such as teaching time and materials used.

### Findings:

The certification program was successful in changing student's behavior on three of the five tasks for which special materials were developed. For two of these tasks, the distinctiveness of the certification training materials may explain the results. No changes occurred on the control tasks. Desired changes in instructor behavior were more likely on the experimental tasks than on the control tasks.

#### Utilization of Findings:

The Dragon instructor certification training materials and tests were given to the 29th Infantry Regiment. The regiment has planned a weapons instructor certification program using the Dragon materials as a model.

# INSTRUCTOR CERTIFICATION MATERIALS AND OBSERVATION INSTRUMENTS FOR DRAGON WEAPON TRAINING

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# INSTRUCTOR CERTIFICATION MATERIALS AND OBSERVATION INSTRUMENTS FOR DRAGON WEAPON TRAINING

## Introduction

The theme for the Army in 1987 was training. In 1988 it was the year of the noncommissioned officer (NCO). An important intersection of these two themes is the Army training conducted by NCOs. This training is key to producing combat-ready forces.

The Army has a system for developing instructional programs and materials, called the Systems Approach to Training (Department of the Army, 1988), and trains soldiers to be instructors through the Trainer Development Program (TRADEP). However, the challenges facing this process are great. The resources required to support all aspects of the systems approach to training are not always available within Army schools. TRADEP focuses on general instructional skills as opposed to skills uniquely appropriate to a subject. Turbulence in the instructor population makes quality control difficult. Soldiers are not always instructors by choice, but are frequently instructors by designation. Given such circumstances, establishing and maintaining quality instruction is difficult.

Despite the resources devoted to Army training and the recognized importance of such training, the amount of instructor training is small in comparison to the preparation required of public school teachers. In addition, public school teachers have selected teaching as their profession, whereas NCOs have selected soldiering as their profession.

The instructor certification research conducted by Lucariello and Dyer (1990) investigated the effects of a weapons certification program. It was intended to provide NCOs instructional skills that applied directly to the weapon taught. The weapon selected was the Dragon, the Army's one-man portable, medium range, antitank weapon system. This report documents the certification materials developed for the research effort, and the instructor and student observation forms developed for evaluating the certification process. In addition, suggestions for modifying the instructional materials and observation forms are given.

The Dragon training examined was the Infantry one station unit training (OSUT) course. The OSUT Dragon program of instruction (POI) is a 40 hour week of instruction. Upon successful completion of the course, an additional skill identifier (ASI) of C2 is awarded to the soldier's military occupational specialty (MOS) of 11B (Infantryman). OSUT soldiers are instructed on ten tasks. The tasks are Prepare the Dragon for Firing, Determine Engageability of Targets, Prepare an Antiarmor Range Card, Perform Malfunction Procedures, Maintain the Day Tracker and Round, Operate the AN/TAS-5 (night tracker), Demonstrate Firing Positions, Construct a Fighting Position, Restore the Dragon to a Carry Configuration, and Engage Targets. Engage Targets is performed on the launch effects trainer (LET), a training device which simulates the launch effects of the Dragon and allows the student to develop the tracking skills needed to engage a target successfully. Instruction for all tasks occurs in a small group format with a ratio of approximately one instructor to four students.

## Procedure

### Research Design

The research consisted of three, two-week phases. The pre-certification phase consisted of collecting two weeks of baseline data (two different Dragon classes). The instructor certification phase followed. The post-certification phase consisted of two weeks (two different Dragon classes) of data collection after instructors completed the certification phase. Data were also collected one month after the Dragon course to determine task retention.

Instructors were assigned to one of three groups. Four current Dragon instructors were observed during the pre- and post-certification phases, and received certification training. A group of three current Dragon instructors was observed during only the pre-certification phase. The third group consisted of four TRADEP qualified instructors who were not Dragon instructors. They received Dragon OSUT training during the first week of pre-certification data collection, acted as assistant instructors during the second week of pre-certification, received certification training, and were observed as instructors during the post-certification phase.

Five of the ten Dragon tasks were designated experimental. This meant that special materials were developed to train and certify instructors on their proficiency in teaching these tasks. These five tasks were: Prepare for Firing, Engageability, Antiarmor Range Card, Malfunction Procedures, and Engage Targets. These tasks were selected as experimental because they represented the different types of knowledge and procedures a student needs to successfully pass the Dragon course. The remaining Dragon tasks were control tasks. Instructor behavior and student performance were recorded for all tasks.

There were seven primary observers. Five were senior NCOs (TRADEP qualified) assigned to the research project. Two observers were research psychologists. Additionally, five substitute observers made 2% of the observations. Observers received four days of training. During this time, they reviewed the instructor training materials, the observation forms and instructor evaluation forms. They spent one day on the range observing training, and recording instructor and student behavior prior to the start of data collection. An observer was assigned to one instructor and approximately four students each week. No observer/instructor pair was duplicated during the four Dragon classes.

### Instructor Certification

Prior to the research, the cadre responsible for OSUT Dragon instruction wrote an instructor training and certification program (Department of the Army, 1989) for Dragon instructors. The first part of the certification program covered personal qualifications and TRADEP certification. Part two consisted of instructor training which outlined the tasks on which an instructor must be proficient. Part three contained training and coaching techniques sections and performance evaluation. New instructor training materials and evaluation procedures were developed by the Army Research

Institute for this part of the certification program. The effectiveness of these materials was the focus of the research. The materials are found in Appendixes A through J.

Training materials. The principles underlying the certification training materials were based on the Gagne-Briggs' theory of instruction (Petry, Mouton & Riegeluth, 1987). They stressed the value of practice in acquiring a skill, the importance of instructor feedback during skill acquisition, the value of memory cues and strategies, and procedures for ensuring students understand the task or skill. For some of these tasks, training aids were also developed. Each contained the training objective, and the conditions and standards for that objective.

Prepare the Dragon for Firing requires the student to perform sequentially the steps needed to go from carrying the Dragon round and day tracker to a firing position. An instructor booklet (Appendix A) was prepared with graphic illustrations of each task step, and training tips and notes for the instructor. The tips and notes stressed such factors as providing a good demonstration of all steps, allowing each student time to practice the task, providing corrective feedback whenever errors occurred, explaining why critical steps must be performed, and reviewing critical points. Because this task is the student's first introduction to the parts of the Dragon, the instructor was told to be consistent when identifying them.

In Target Engageability, two distinct task parts are performed: determine if the vehicle is in or out of range using the Dragon sight's stadia lines (requires applying one of two rules), and if it is in range, determine whether or not it is engageable using the sight picture (one rule). The certification materials (Appendix C) stressed the key concepts in each rule, clear presentation of the rule prior to presentation of examples, student practice on a variety of examples to ensure generality of the rule, and immediate feedback. The training aids developed for this task allowed students to practice without using the Dragon system, and allowed the instructor to observe the student's use of the stadia lines and sight picture. Direct observation of these actions is not possible when the student uses the Dragon sight itself, as is typically the case. The aids were laminated pictures of targets of different sizes at varying angles, and of target scenes. The sight picture aid was a transparency with a mask surrounding the outside of the sight picture in order to simulate the gunner's field of view including the sight's cross hairs and stadia lines. Thus, the instructor could observe directly how the student placed stadia lines on a target to determine if it was within range.

Prepare an Antiarmor Range Card is a paper and pencil task which requires the student to recall and portray a sector of fire and all its parts. Additionally, the student must possess compass (e.g., determine a back azimuth) and mathematical (e.g., determine distance and intervals) skills. The certification materials (Appendix E) stressed defining of range card concepts and acronyms, reviewing rules learned in previous instruction applicable to the range card, preparing several different range cards to ensure

mastery of basic concepts instead of memorization of one situation, and providing corrective feedback to students after each trial.

Malfunction Procedures are performed to determine if a round has misfired or is a hangfire. It is a procedural task with non-inherent task elements. That is, the student must pretend to feel a cold or hot battery, and verbalize the steps of replacing the round and tracker, depending on the status of the battery. As taught and tested, the task consists of approximately 50 steps. The certification materials (Appendix G) were designed to help the instructor divide the task into its logical components, so students would find it easier to learn and retain. A training aid compared the misfire and hangfire procedures to illustrate critical differences as well as similarities between the two procedures.

Engage Targets with the LET is the task which determines whether a student will be qualified as an "expert" or "1st class" gunner. The LET simulates the launch and flight characteristics of the Dragon system. Successful firing of the Dragon requires a gunner not be distracted by the Dragon's launch characteristics such as weight loss and noise, and maintain a smooth track throughout missile flight. Because firing position affects the reaction to missile launch, the instructors were given key points to stress about the position, and student behaviors to observe during LET practice that reflected deviations from this position. In addition, because the LET does not provide direct feedback to the student, including whether the target was hit, immediate correction of errors was emphasized, and ways in which the instructors could improve feedback to the students were cited (Appendix I).

Tests. Each certification test consisted of two parts: an assessment of the instructor's ability to instruct, and an assessment of the instructor's ability to identify student errors, analyze the reason for the error, and provide corrective feedback to the student. The ability to assess errors and provide appropriate feedback was judged to be particularly important given the types of tasks and skills taught. In addition, in order to produce qualified gunners within a very short time period, instructors had to be able to reduce the incidence of student errors by providing timely and appropriate feedback. Two trials were allowed for instructors to pass each test.

To assess the instructor's ability to convey subject matter to students, information from the student handbook was organized into a checklist format. The instructor was told to present, demonstrate, and/or explain the task to a student. Other company cadre role-played as students. The instructor received a "GO" if each item on the checklist was covered during the presentation, and a "NOGO" if it was not. Graders were the senior NCOs of the training company. This procedure was used for all five experimental tasks.

To determine the instructor's ability to identify, diagnose, and correct errors, the role-playing soldiers deliberately made errors as specified in the test materials. In some cases, situations with errors were presented to the instructor in a paper-pencil format. The instructor was graded on identification of errors, and on corrective feedback

provided. For each task multiple errors were generated to provide sufficient test instances for the initial test and possible retest.

For Prepare for Firing (Appendix B), five possible errors were generated for test purposes. The test focused on assessing the instructor's ability to provide feedback to help the student remember the task steps. For example, one error tested was instructor's assessment of the student's failure to check for secure mating of the tracker to the round. To pass this item, the instructor had to identify the error, then remind the student to ensure a secure mate by trying to move the tracker back and forth, and finally have the student perform the step correctly.

The instructor's ability to identify and diagnose errors on the Determine Target Engageability was tested in a paper and pencil format (Appendix D). The instructor's ability to identify student problems in applying both engagement rules was assessed. Examples and illustrations of a student's performance, including placement of stadia lines on targets, were given.

On the Antiarmor Range Card test, five range cards, with errors, were constructed (Appendix F). Range card errors included omission of information, inappropriate symbols, errors in mathematical calculations, and incorrect labels. The cards were laminated for durability.

For Malfunctions, five different situations were presented (Appendix H). As with the other tasks, the instructor had to identify the error committed. However, on this task, five methods of correcting the student were listed, and the instructor had to select which method(s) of correction was (were) appropriate.

For LET firings, seven possible errors were identified for test purposes (Appendix J). Errors reflected student problems in establishing and maintaining a proper firing position, breath control, reactions to launch effects, and making proper system adjustments. The instructor's ability to interpret and use the readings on the LET was also assessed.

#### Observation Forms used during Dragon OSUT Instruction

Instructor observations. For each task taught, the observer recorded instructional start and stop times, total practice time given to the students, and whether the task components were taught. For all tasks except the LET, additional information was collected on the method of instruction, plus unusual events during training. A core set of five critical questions asked if the instructor used the same terminology throughout instruction, immediately corrected errors during practice, used training aids, used memory cues, and stressed critical points. Additionally, there were questions which were specific to a task (e.g., definition of terms, emphasis on specific procedures, use of examples). The overall student pass/fail rate was recorded. A similar format was used for the nine nonLET tasks. These forms are in Appendixes K, M, O, Q, S, U, W, Y, and AA.

During LET practice and qualification, eight specific instructor behaviors were recorded (see Appendix CC). The measures reflected the instructor's interaction with each student before, during, and after each firing. The before firing measures were whether the instructor watched the student and whether feedback or guidance was provided as the student prepared to fire. During each LET track, observers recorded whether the instructor watched the student, whether feedback was given to the student about the firing position (e.g., keep eye in the eyepiece, lean more to the left, keep elbows together), and/or whether the instructor watched the indicator meter or "gyro" on the LET. The indicator meter provides a continuous update of the student's aimpoint in the horizontal and vertical planes, thus simulating the missile flight pattern. Upon completion of an engagement, the observers recorded whether the instructor told the student the results of the trial (hit or miss) and the final indicator meter (aiming) score. In addition, if a miss occurred, the instructor could indicate the time during missile flight when tracking errors were made.

The observation instruments stressed behaviors used in previous teacher-effectiveness and process-product research (e.g., Good & Grouws, 1977). Engaged time (Berliner, 1979), defined as the time students attended to the subject matter, was recorded. Most of the other behavior observed could be categorized as low-inference descriptions of teacher-student interactions (e.g., did the instructor use a particular training aid or did the instructor define certain terms or stress a particular sequence to be followed on task?). High-inference descriptions were not required of the observers (e.g., did the instructor present the material clearly?).

Student observations. Students were observed as they practiced each task. The number of practice trials and errors were recorded. Additionally, students were observed when tested. The qualification errors and pass/fail performances were scored. The observation forms allowed for three attempts to pass a test. In addition, observers had to respond to five questions at the conclusion of each test: whether the instructor asked leading questions to help the student pass, whether the observer would have passed the student, whether the instructor stopped the student when a mistake was made, whether the instructor told the student when a mistake was made but allowed the student to continue, and whether anything unusual occurred during testing. This format was used for all tasks, except the LET firings.

Student behavior on the LET was recorded on the same form used for instructor behavior. The student's hit/miss and final indicator meter score data were recorded. Additionally, the direction in which the target vehicle was moving was noted. Student observation forms for all tasks are in Appendixes L, N, P, R, T, V, X, Z, BB, and CC.

## Discussion

### Certification Findings

The research showed that an instructor certification program tailored to a specific course was feasible and successful. Student performance improved on tasks included in the instructor certification program, and not on the control tasks. Instructors used more



of the desired principles of instruction after certification training. In general, the Dragon certification program worked well.

The only significant changes in student performance from pre- to post-certification occurred on three experimental tasks: Prepare to Fire, Determine Target Engageability, and LET practice trials from the standing supported position. No changes occurred on the control tasks.

One possible explanation for the positive results on Prepare and Engageability is the distinctiveness of the certification training materials. The Prepare training booklet (Appendix A) was formatted in a style familiar to the military. Drawings and graphics supplemented the text to increase interest in the materials. For Engageability, the laminated training aids for the Dragon sight, and drawings of vehicles at various angles and ranges (Appendix C) may have attracted the instructors' attention. The instructional materials stressed using these aids to present sufficient examples of engageability rules and concepts to ensure student mastery. The LET results may be attributed to inherent task properties. LET firings from the standing supported position are harder than from the sitting position (U.S. Army Combat Developments Experimentation Command, 1979; U.S. Army Infantry Board, 1972). Thus, there may have been more opportunity for instructor interaction such as corrective feedback, which was stressed in the LET training materials (Appendix I). In turn, the feedback could have lead to improved student performance during practice.

Further information on student performance results is in Lucariello and Dyer (1990). In addition, changes in instructor behavior, the relationship between instructor behavior and student performance, and task retention are documented in the report.

### Observation Forms

The checklist format of the observation forms worked effectively for all observers. The GO/NOGO format was familiar to the NCOs because it is used frequently in weapons instruction training. The forms required only low-inference descriptions of instructor behavior, which reduced the degree of subjectivity required of the observers.

Certain questions and data common to all observation forms proved to be particularly valuable. The common core of questions on instructional techniques plus instructional time and task content covered provided an index of instructor quality. This index was used to rank instructors, and correlated significantly with student performance. Such a relationship might not have occurred if only task specific questions had been asked. In addition, the question which asked the observers to indicate whether they would have passed each student proved to be particularly critical, because it was another factor which discriminated the "good" from the "poor" instructors, and identified a need to train instructors on testing procedures.

The following improvements should be made to the forms. A procedure for recording the time each student practices, whether it is individually or in a group, should be included. The forms were developed for individual, not group, practice. Provisions

should be made on the student observation form to record errors of commission. The present forms provide for errors of omission only.

### Certification Materials

Developing tests on instructor's ability to identify errors, to diagnose the reasons for the errors, and to correct students appropriately was difficult. High familiarity with the subject matter was required. If there could be multiple reasons for an error, then these options, as well as the corresponding solution(s), had to be identified. Sufficient examples of errors had to be generated to allow for two test trials in case the instructor failed on the first trial. In addition, the test format created problems. Paper-pencil tests, video-tape, and role-playing were all considered as means of presenting student errors to the instructors. The final decision was to use role-playing, although some tests also included a paper-pencil format. For a permanent certification program, however, role-playing is the most costly approach. Therefore, other forms of testing should be explored in future research.

The certification standards for the instructors were more stringent than those for the students. Instructors were required to present all the required content within two trials. The typical standard for the instructor's ability to diagnose errors and provide corrective feedback was 80% correct within two trials. There was no systematic attempt to validate these standards during the research. However, the instructors' use of the critical instructional techniques during certification correlated with their use during the OSUT Dragon classes (Lucariello & Dyer, 1990). In turn, use of these techniques during OSUT correlated with student performance. The instructors who ranked highest on the indices of instructor quality were those who typically presented all the task steps the first time tested, and made no mistakes in assessing student errors during the certification process. On the other hand, the instructors who ranked low on these indices sometimes omitted as many as 80% of the task steps, and failed to identify and to correct errors on as many as 70% of the items tested during certification.

### Conclusions

Despite the positive findings, if a weapons certification program is to be highly successful, additional research on methods that have both immediate and long-term effects on modifying instructor behavior is required. The certification program was successful in modifying only certain instructor behaviors, and student performance did not increase on all experimental tasks. New instructors found it difficult to identify and appropriately correct student errors. Task retention was low over a one-month period. Thus the greatest challenge resulting from the research effort is how to develop powerful instructional materials which consistently produce the desired effect and sustain that outcome.

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APPENDIX A

INSTRUCTOR CERTIFICATION TRAINING MATERIALS:

PREPARE DRAGON FOR FIRING

# **DRAGON INSTRUCTOR CERTIFICATION PROGRAM**

**TRAINING OBJECTIVE:  
PREPARE THE M47 MEDIUM ANTITANK  
WEAPON SYSTEM FOR FIRING**



# DRAGON INSTRUCTOR CERTIFICATION PROGRAM

**TRAINING OBJECTIVE:** Prepare the M47 medium antitank weapon system for firing.

**CONDITIONS:** Given a dragon day tracker in the carrying bag and a simulated round of ammunition (FHT), in the carrying configuration.

**STANDARDS:** Within 30 seconds mate the tracker to the FHT IAW the performance measures.

## REQUIRED TRAINING AIDS:

- DRAGON day tracker in carrying bag
- FHT
- Drawing of sight pictures

**ENSURE ALL EQUIPMENT IS AVAILABLE AND IN GOOD REPAIR**

## TRAINING TIPS:



- **Review** - Describe main system components using correct terms.
  - *This reinforces learning from previous day.*
- **Demonstrate** - Show the correct procedures.
  - *Give student clear understanding of task.*
- **Practice** - Allow each student sufficient time for practice.
  - *Motor skills are best learned through repetition.*
- **Feedback** - Give immediate feedback during practice.
  - *Reinforces appropriate behaviors.*
  - *Point out errors as they occur to prevent the learning of incorrect responses.*

## I. REVIEW MAIN SYSTEM COMPONENTS

- Carrying bag containing tracker
- Round of ammunition (FHT)
- Front and rear shock absorbers
- Bipod
- Bipod friction lock
- Foot adjust
- Tracker support assembly rails
- Telescope barrel
- Trigger mechanism
- Electrical connector cover
- Tracker lens cover
- Tracker guide pins



### TRAINING TIP:



- Call on students to identify components while instructor points at each.
  - *Reviewing previously learned material enhances retention.*
- Use the same term to refer to a component or procedure.  
**BE PRECISE.**
  - *Clarity of presentation is important in learning new material.*

## II. DEMONSTRATE PREPARATION OF DRAGON FOR FIRING

- Select student to demonstrate task and talk him through it.
- Always explain procedure in same sequence.
- Explain new material as concisely as possible.  
**PREFERRED:** Reach in and grab tracker by the telescope barrel and remove tracker.  
**NOT AS GOOD:** Reach in and grab tracker by the telescope barrel or by the trigger mechanism and remove tracker.
- Explain why procedure is performed; associations help students learn new material.

## PERFORMANCE MEASURES:

1. Prepare the round for firing.
  - a. Unsnap the bipod retaining strap (Figure 1A).
  - b. Push the bipod forward until resistance is met, then slap off the forward shock absorber (Figure 1B).

**NOTE:** For training purposes make sure the forward bipod brace is engaged in the locked position when using the FHT .

- c. While still holding the round, depress the bipod friction lock and push the bipod legs downward to number 4 or 5, then release the friction lock (Figure 1C).

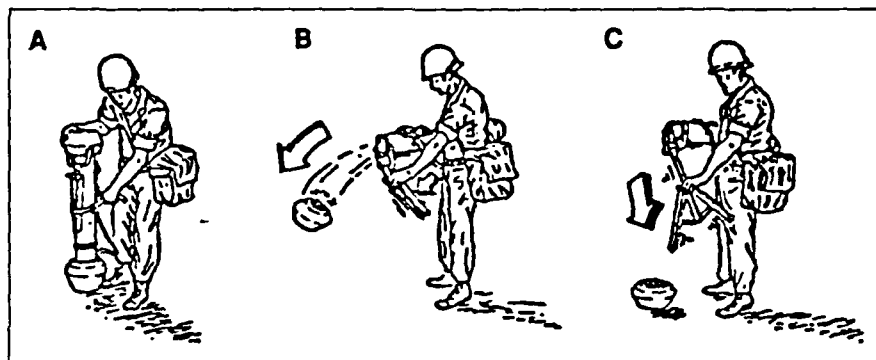


Figure 1. Releasing the bipod legs.

## INSTRUCTOR'S NOTES:

### EXPLAIN

- Place Dragon round of ammunition (FHT) on ground with rear shock absorber on bottom so bipod legs can be extended easily.
- Unsnap the bipod retaining strap to free bipod.
- With right arm lift round of ammunition to horizontal position.
- With left hand push bipod legs forward to pop off the forward shock absorber.

### CAUTION

**THE BIPOD CAN COLLAPSE IF BRACE IS NOT ENGAGED.**

- The bipod legs are locked so the round of ammunition (FHT) will be stable during adjustments.
- Setting the bipod legs on 4 or 5 adjusts the height of the round of ammunition (FHT) correctly for most soldiers.



## **PERFORMANCE MEASURES:**

2. Select a firing position that best meets the situation. For purposes of illustration, the sitting position is used in this handbook.

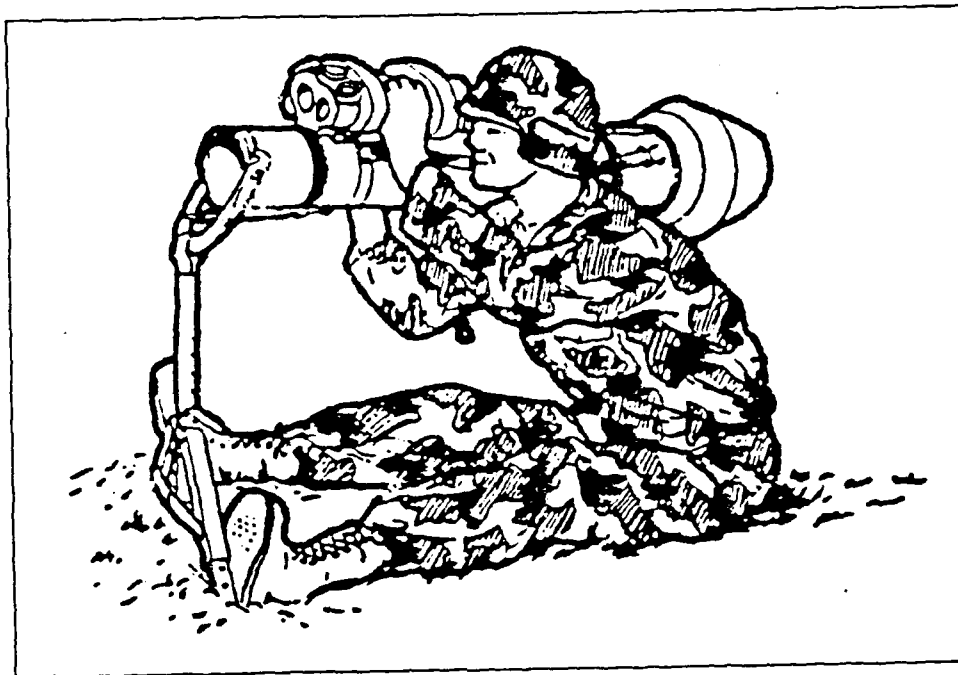


Figure 2

## **INSTRUCTOR'S NOTES:**

### **REVIEW CORRECT SITTING POSITION**

#### **EXPLAIN**

- Proper sitting position means:
  - Legs extended
  - Heels on bipod legs
  - Lean forward at waist as far as possible
  - Elbows tucked in
  - Pressure applied downward and rearward on the tracker
  - Press eye against eyeguard
- COMMON ERROR DURING TESTING:
  - Student not in correct firing position when confirming sight picture.

### **PERFORMANCE MEASURES:**

3. Remove the day tracker from the carrying bag.
  - a. Pull the carrying bag flap open and hold it open with your right hand.
  - b. Reach in and grasp the tracker by the telescope barrel or by the trigger mechanism and remove the tracker.

#### **CAUTION**

**DO NOT ATTEMPT TO LIFT THE DAY TRACKER USING THE SHOCK ABSORBERS AS HANDLES. THEY WILL TEAR OFF.**

**DO NOT TOUCH THE LENS. YOU CAN DAMAGE THEM BY JUST TOUCHING THEM WITH YOUR FINGERS.**

- c. Remove the electrical connector cover from the electrical connector. Secure the cover to the hook-pile tape on the forward shock absorber of the tracker.

### **INSTRUCTOR'S NOTES:**

There are no electrical connector covers on the FHT used for training. Students must **simulate** removing the electrical connector cover while saying, ***"I am removing the electrical connector cover."***

## DRAGON INSTRUCTOR CERTIFICATION PROGRAM

\*\*\*\*\*  
TRAINING OBJECTIVE: DETERMINE ENGAGEABILITY OF TARGETS WITH  
AN M47 MEDIUM ANTITANK WEAPON

CONDITIONS: Given a Dragon day tracker, field handling trainer, an assigned sector of fire with three different engagement situations, and a miniature village with 1 to 35 scaled threat vehicles. The three engagement situations are selected from the following 15 conditions:

- Flank target in range and engageable
- Flank target in range and nonengageable
- Frontal target in range and engageable
- Frontal target in range and nonengageable
- Rear target in range and engageable
- Rear target in range and nonengageable
- Flanking oblique target in range and engageable
- Flanking oblique target in range and nonengageable
- Frontal oblique target in range and engageable
- Frontal oblique target in range and nonengageable
- Flank target out of range and therefore nonengageable
- Frontal target out of range and therefore nonengageable
- Rear target out of range and therefore nonengageable
- Flanking oblique target out of range and therefore nonengageable
- Frontal oblique target out of range and therefore nonengageable

[Note.- These test conditions differ from the training conditions described in this document. Training is conducted with visual training aids, while testing is conducted with Dragon equipment and the mini-village.]

STANDARDS: For each engagement situation, the gunner must determine if the target is within or out of range, and whether it is engageable or nonengageable. An error in either decision constitutes a NO GO for a trial (100% correct responses are required). A maximum of three trials is allowed.

\*\*\*\*\*  
**REQUIRED TRAINING AND TESTING AIDS**

- Illustration of stadia lines
- Photographs/illustrations of flanking, frontal, rear, & oblique targets
- View graphs with stadia lines
- Drawings of target scenes
- Scaled vehicles
- Dragon day tracker - Test only
- Field handling trainer - Test only
- Miniature village with 1-35 scaled vehicles - Test only

\*\*\*\*\*

TRAINING ASSUMPTION: Training is conducted in small group format.

\*\*\*\*\*

### TRAINING TIPS

State the purpose of block of instruction.

This tells the student what he must be able to do.

Define/clarify key terms/concepts in rules.

Critical concepts must be learned before presenting the engagement rules.

Present rule

Presentation of a rule or principle prior to examples of it enhances learning.

Provide practice on varied examples of engagement situations - allow each student sufficient practice.

Understanding of rules is achieved through repeated and varied applications.

Ensures students can apply engagement rules in unexpected situations, rather than memorizing the task.

Ensures students remember task beyond OSUT.

Gives students confidence they can perform the task.

Provides means of informing you, the instructor, whether students can perform the task without errors and with confidence.

Feedback - give immediate feedback during practice.

Feedback reinforces appropriate behaviors.

Feedback provides guidance to students.

Immediate feedback points out errors as they occur and prevents the learning of incorrect responses.

Teach ranging rules first, then engageability rule.

Learning is enhanced if different rules are presented separately during initial instruction.

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## RANGING RULES

### 1. State purpose of block of instruction

To determine whether a target is within or out of range of the Dragon by using either the day or night tracker.

#### Instructor Notes:

- Remind students why the range of Dragon is limited, and of its maximum range, so they understand and remember why determining range is necessary.
- Remind students that line-of-sight to the target is required to fire the Dragon.

### 2. Define/clarify key terms and concepts

Stadia lines  
Cross hairs

Reticle  
Sight Picture

Types of targets  
Flanking  
Frontal  
Rear

Flanking oblique  
Frontal oblique

Explain what type of target is highest priority

#### Instructor Notes:

- Use illustration of Dragon day and night tracker reticles when explaining stadia lines and the difference between stadia lines and cross hairs.
- Show illustrations of the various types of targets; scaled model may be useful for showing aspect angles associated with oblique targets.
- Using a different set of examples/illustrations, call on students to identify the different types of targets.

### 3. Present ranging rules

State the full stadia rule as clearly and precisely as possible.

Explain how to center target in reticle to apply the rule.

Show at least one illustration of a target within range and a target that is out of range using the full stadia rule.

Ensure student mastery of full stadia rule before proceeding to half stadia rule.

State the half stadia rule as clearly and precisely as possible.

Explain how to center target in reticle to apply the rule.

Show at least one illustration of a target within range, and a target that is out of range using the half stadia rule.

Explain why the full and half stadia rules work.

State that if a target is out of range with either rule, it is also nonengageable.

Instructor Notes:

- Lay view graphs of reticle on top of vehicle drawings to generate illustrations of targets within and out of range.
- Show examples of incorrect use of stadia lines to clarify the rules.
- Reinforce importance of adjusting focus ring to obtain a clear picture.

**4. Provide practice and feedback on varied examples of engagement situations**

Call on each student to determine whether a target is within range.  
Have each student explain answer.

Ensure examples differ from those used previously.

Instructor Notes:

- Have students place the reticle view graph on target vehicles to ensure they know how to sight on the target with the tracker.
- When a mistake is made, correct the student, and ask why the answer was incorrect. Explain why if student does not know. Then present another example to ensure understanding of the rule.
- The visual aids give you a means of checking whether the student truly understands the rules, before using the day tracker.

\*\*\*\*\*

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## ENGAGEABILITY RULE

### 1. State purpose of block of instruction

To determine whether a target will still be in the gunner's line of sight as the missile travels down range, by using the sight picture in the day and night trackers.

Instructor Notes:

- Remind students of time of flight of Dragon missile.
- Remind students of the average cross country speed of a vehicle.

### 2. Define/clarify key terms/concepts

Sight picture

Instructor Notes:

- Show illustration of sight picture to ensure understanding.

### 3. Present engageability rule

State engageability rule as clearly and precisely as possible. Stress it applies only to targets that are within range.

Illustrate rule with scenes on which view graph of the reticle has been imposed. Show at least one example of a target that is not engageable; show at least one target that is engageable.

Show an example of a gunner not using the sight picture correctly.

Explain why the engageability rule works.

Remind student to assess the direction of movement of the target.

### 4. Provide practice and feedback on varied examples of engagement situations

Call on each student to determine whether a target is engageable; have each student explain answer.

Instructor Notes:

- Ensure the examples differ from those used previously.
  - Have students place the reticle view graph on target scenes to ensure they know how to move the tracker to determine engageability.
  - When a mistake is made, correct the student, and ask why the answer was incorrect. Explain why if student does not know. Then present another example to ensure understanding of the rule.
- \*\*\*\*\*

\*\*\*\*\*

## INTEGRATION OF RANGING AND ENGAGEABILITY RULES

### 1. Call on each student at least once to determine:

- a) whether student can determine whether a target is within or out of range
- b) whether the target is engageable

Have the student explain all answers.

2. **Involve the other students:** Have another student be prepared to evaluate the first student's performance. If both students are wrong, then you as the instructor must correct both, and explain the correct answer. In such cases, present another example to ensure understanding of the rules.

#### Instructor Notes:

- Use the training aids (drawings of target scenes and tracker reticle view graphs) to generate examples.
- Practice will reinforce the rules and also serve as a review of the material to enhance retention.

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## TESTING PROCEDURES

1. **Check student's use of the day tracker before starting the test.** [A student may fully understand the engageability rules, but have trouble using the equipment or sighting on the target.]

- First, ensure the student sees the cross hairs and stadia lines in the day tracker.
- Second, ensure the student has adjusted the focus ring to obtain a clear picture.
- Third, ensure eye guard is rotated to fit the student's eye.

2. **Determine if student is viewing the intended target.** Ask the student to state the target number.

3. **Proceed with test trial.**

#### Instructor Notes:

Remedial instruction is needed if student makes errors in the test situation.

\*\*\*\*\*



## TRAINING AIDS PACKET

### DETERMINE ENGAGEABILITY OF TARGETS WITH AN M47 MEDIUM ANTITANK WEAPON

#### CONTENTS - INSTRUCTOR DEMONSTRATION MATERIALS

##### LAMINATED HARD COPIES

- A One illustration of Dragon reticles on day and night trackers
- B One page with one illustration of each of the following targets
  - Flank target
  - Frontal target
  - Flanking oblique target
  - Frontal oblique target
- C One page with 3 flank targets, each a different size to illustrate full stadia rule. Use with view graph G.
- D One page with 3 frontal targets, each a different size to illustrate half stadia rule. Use with view graph G.
- E One page with 3 flanking oblique targets, each a different size, to illustrate full stadia rule. Use with view graph G.
- F One page with 3 frontal oblique targets, each a different size, to illustrate half stadia rule. Use with view graph G.
- H One page with three illustrations of flank target approaching a forested area to illustrate engageability rule. Use with view graph I.

##### VIEW GRAPHS OF DAY RETICLE

- G One view graph of Dragon day sight, sized to correspond to Items C - F. (Larger than view graph I.)
- I One view graph of Dragon day sight, sized to correspond to Item H. (Smaller than view graph G.)

## TRAINING AIDS PACKET

### DETERMINE ENGAGEABILITY OF TARGETS

#### CONTENTS CONTINUED - STUDENT PRACTICE MATERIALS

##### LAMINATED HARD COPIES

B1 One page with one illustration of each of the following targets:

- Flank target
- Frontal target
- Flanking oblique target
- Frontal oblique target

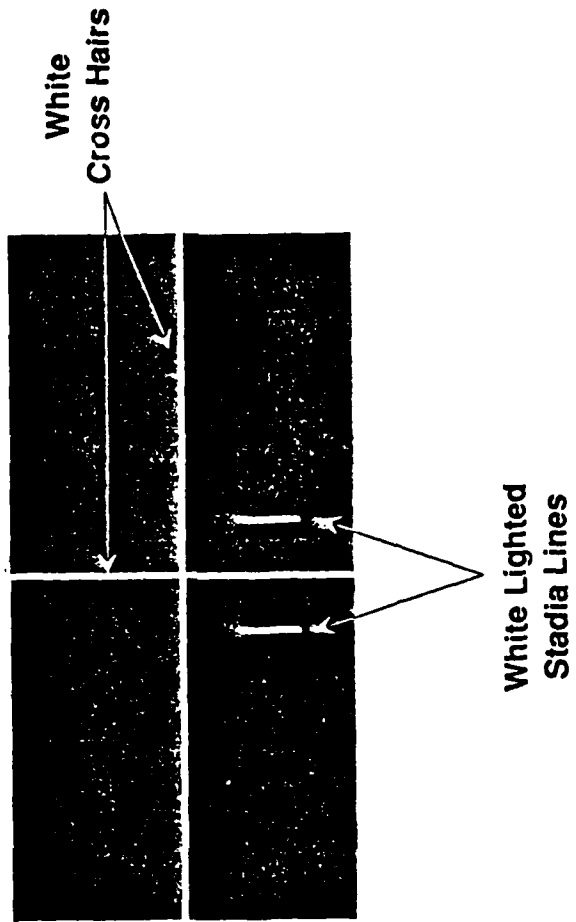
J1-G One page of illustrations of eight targets for practice of ranging rule.  
Use with view graph G.

J1-I One page of illustrations of eight targets for practice of ranging rule.  
Use with view graph I.

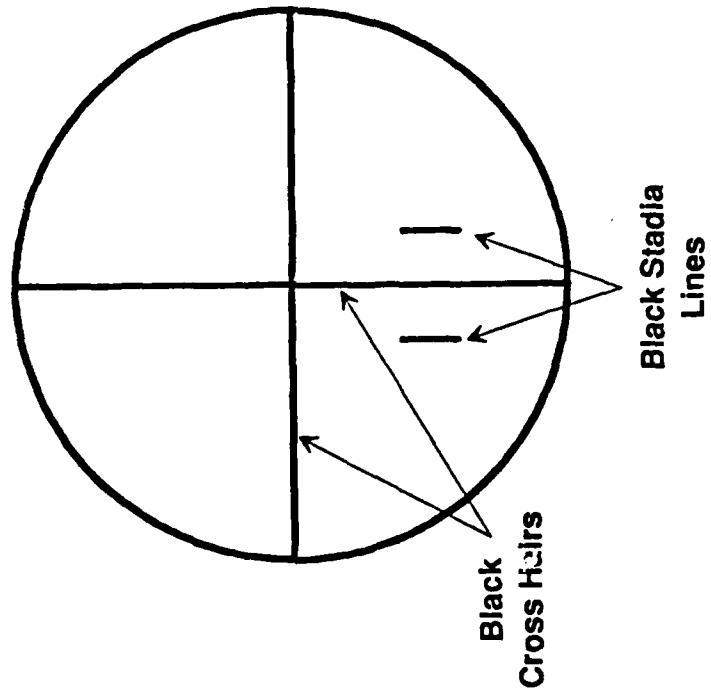
K1-G, K1-I, K2-I, K2-G, K3-1 (2 pages),

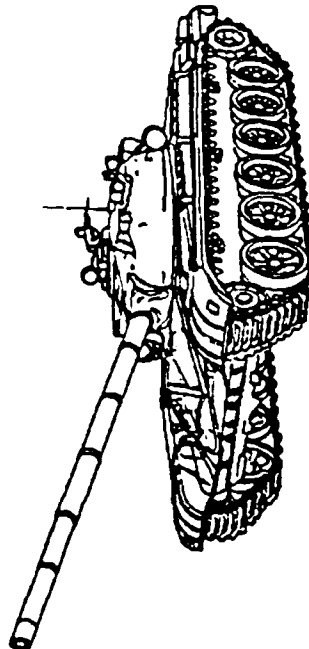
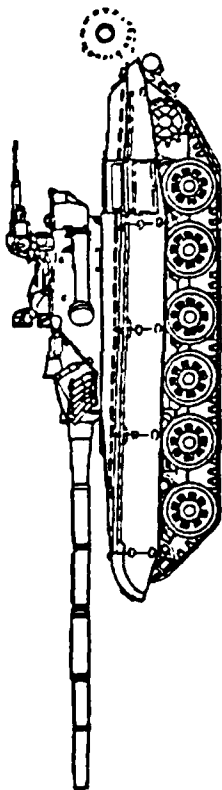
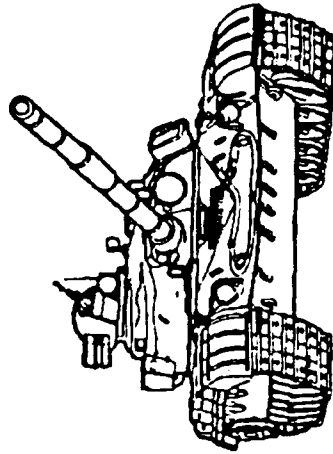
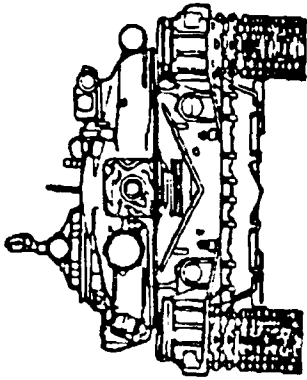
Five pages of illustrations of targets and a forested area for practicing application of both the ranging and engageability rules. Can be used with view graphs G and I.

## NIGHT TRACKER



## DAY TRACKER









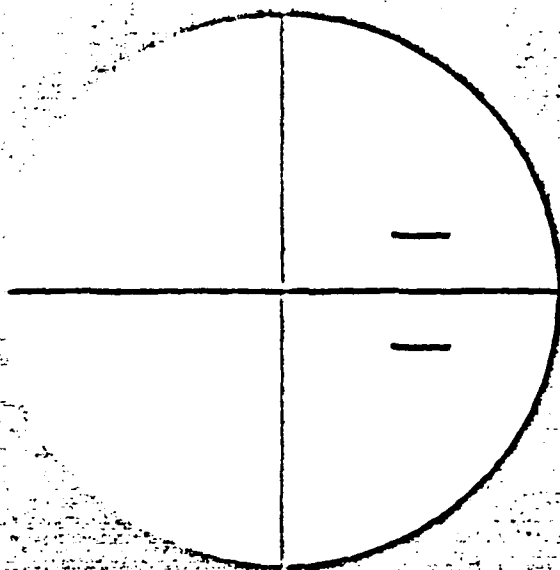
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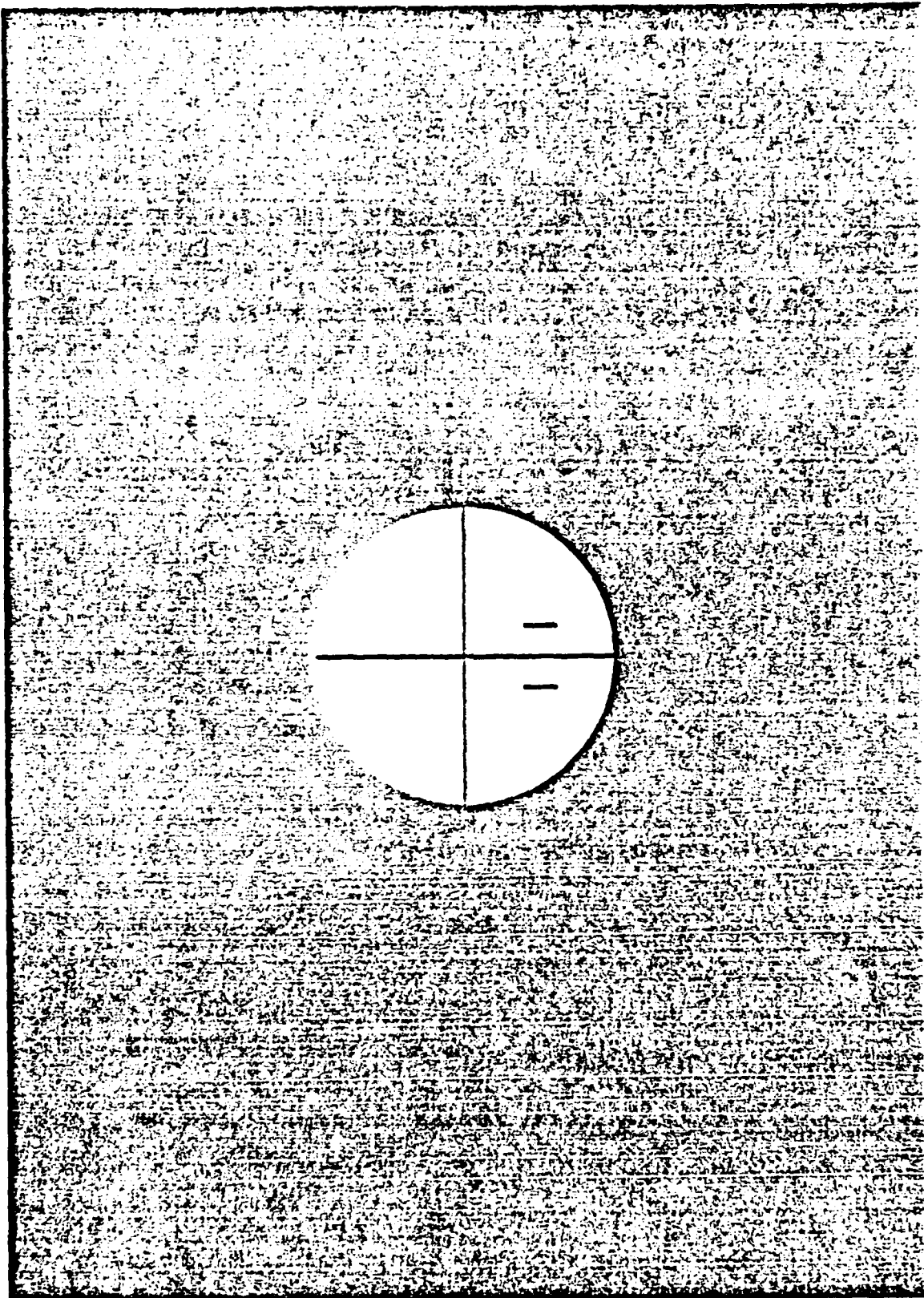


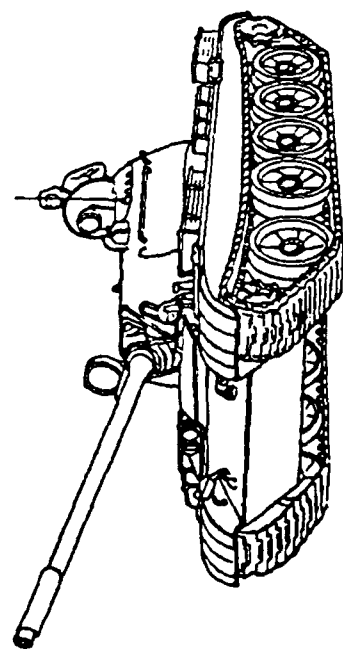
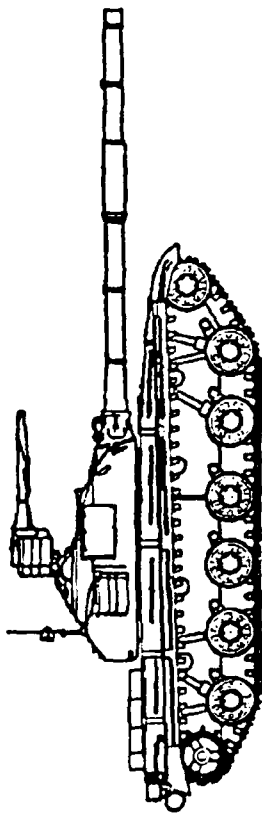
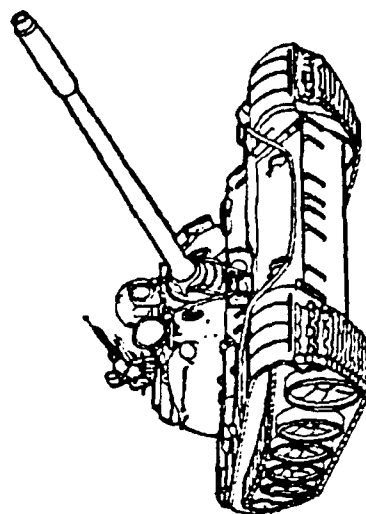
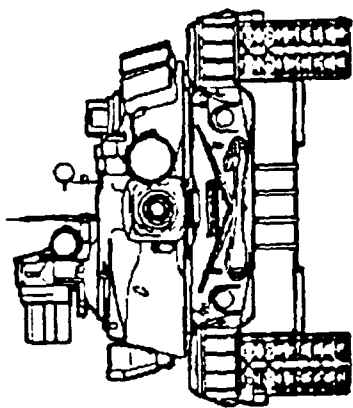


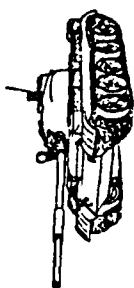




























APPENDIX D:

INSTRUCTOR CERTIFICATION TEST  
DETERMINE ENGAGEABILITY OF TARGETS

## **DRAGON INSTRUCTOR CERTIFICATION TEST:**

### **DETERMINE ENGAGEABILITY OF TARGETS WITH AN M47 MEDIUM ANTITANK WEAPON**

The test consists of two parts. Part 1 focuses on the ability of the instructor to explain the task and skills involved with performing the task. Part 2 focuses on the ability of the instructor to identify student errors, analyze the reason for these errors, and correct the student appropriately.

#### **Part 1. ASSESSMENT OF ABILITY TO INSTRUCT**

Instructor Objective: Present block of instruction on determining engageability of a target with the M47 medium antitank weapon.

Conditions: Given instructional materials, including illustrations of targets and reticles. [Since no audience is required, the instructor will be graded only on the ability to explain the task. The instructor is not required to interact with students.]

Standards: Instruction must include 19 of the 23 items (i.e., score 83%) on the score card. A maximum of two trials is allowed.

Testing Procedures: Tell the instructor to present a block of instruction on how to determine if a target is engageable with the Dragon. Any of the training aids developed for the instructor certification program can be used. Instructor evaluation will be based on the adequacy with which all key terms, concepts, and rules are explained and illustrated.

# SCORECARD - ABILITY TO INSTRUCT

Instructor \_\_\_\_\_

Date \_\_\_\_\_

|  | <u>Trial 1</u>  | <u>Trial 2</u>  |
|--|-----------------|-----------------|
| State purpose of block of instruction  | GO / NO GO      | GO / NO GO      |
| Define key terms and concepts  |                 |                 |
| Stadia lines   | GO / NO GO      | GO / NO GO      |
| Cross hairs  | GO / NO GO      | GO / NO GO      |
| Flank target   | GO / NO GO      | GO / NO GO      |
| Frontal/rear target  | GO / NO GO      | GO / NO GO      |
| Flanking oblique   | GO / NO GO      | GO / NO GO      |
| Frontal oblique target   | GO / NO GO      | GO / NO GO      |
| Sight picture or reticle (either one)  | GO / NO GO      | GO / NO GO      |
| Explain full stadia rule for flank targets   |                 |                 |
| Adjust sight picture by moving launcher to<br>center the target between stadia   | GO / NO GO      | GO / NO GO      |
| Meet or exceed the lines, then in range  | GO / NO GO      | GO / NO GO      |
| Within the lines, then out of range  | GO / NO GO      | GO / NO GO      |
| Explain half stadia rule for frontal and rear targets  |                 |                 |
| Adjust sight picture by moving tracker to align<br>vertical cross hair & 1 stadia line on target                       | GO / NO GO      | GO / NO GO      |
| Meet or exceed the lines, then in range  | GO / NO GO      | GO / NO GO      |
| Within the lines, then out of range  | GO / NO GO      | GO / NO GO      |
| Explain rules for oblique targets  |                 |                 |
| If more flank is visible, use full stadia  | GO / NO GO      | GO / NO GO      |
| If more front is visible, use half stadia  | GO / NO GO      | GO / NO GO      |
| State if target is out of range, it is<br>automatically nonengageable  | GO / NO GO      | GO / NO GO      |
| Explain engageability rule   |                 |                 |
| Place edge of sight picture on front of<br>target and inspect anticipated path of<br>vehicle to opposite edge of sight | GO / NO GO      | GO / NO GO      |
| If covered area, not enough time to fire and<br>hit the target   | GO / NO GO      | GO / NO GO      |
| If no covered area, time to fire and hit   | GO / NO GO      | GO / NO GO      |
| Applies only to targets within range   | GO / NO GO      | GO / NO GO      |
| Used visual aids to illustrate terms and rules   | GO / NO GO      | GO / NO GO      |
| Used aids to illustrate <u>all</u> terms and rules   | GO / NO GO      | GO / NO GO      |
| SCORE  | # GOs _____     | # GOs _____     |
| Passing score is 19 and above.   | Pass/Fail _____ | Pass/Fail _____ |

**Part 2. ASSESSMENT OF ABILITY TO IDENTIFY STUDENT ERRORS,  
ANALYZE REASON FOR ERRORS, AND CORRECT STUDENT  
APPROPRIATELY.**

**Instructor Objective:** Diagnose the reason(s) for student errors when determining whether a target is engageable with the Dragon, and describe the necessary corrective actions.

**Conditions:** Given examples of student responses to a series of engagement situations.

**Standards:** Instructor must identify the error, and describe the corrective feedback that should be provided to the student in accord with the guidelines in the test score card. Instructor must respond correctly to 18 of the 22 test items (i.e., score 82%). A maximum of two trials is allowed.

**Testing Procedures:** Give test booklet to instructor. Answers to questions can be oral or written. One-on-one testing with verbal responses is recommended. Score answers according to guidelines on scorecard. Make sure instructor understands the requirement to first identify the problem or error, and then describe what type of corrective feedback should be given to the student.



# SCORECARD - DIAGNOSE STUDENT ERRORS AND PROVIDE CORRECTIVE FEEDBACK

Instructor \_\_\_\_\_

Date \_\_\_\_\_

Trial 1

Trial 2

1. SITUATION. Gunner seemed to understand engageability rules during initial instruction, but makes errors on more than half the targets on the test in the mini-village. There is no consistency in the errors made.

Problem: Not using Day tracker correctly.  
[If the instructor gives one or more of  
the following problems, the answer would  
also be correct.]

GO / NO GO GO / NO GO

- Not sighting on the correct targets.
- Focus ring not adjusted properly.
- Not see cross hairs and stadia lines.

Correction: Determine if student sees  
cross hairs and stadia lines. If so,  
then determine which targets were placed  
in the field of view.

GO / NO GO GO / NO GO

Ask student if sight picture is  
in focus; not blurry.

GO / NO GO GO / NO GO

For Illustrations 1 and 2, the instructor first determine whether an error occurred. If there is an error, the instructor must describe the error (what the student did wrong), and then the corrective feedback to give the student.

2. ILLUSTRATION #1 (Placement of stadia and cross hairs).

Did instructor identify error in 1A?

GO / NO GO GO / NO GO

Problem: Centered target on cross hairs not  
between stadia.

GO / NO GO GO / NO GO

Correction: Explain target should be placed  
between stadia in order to make accurate  
judgments.

GO / NO GO GO / NO GO

Did instructor identify error in 1B?

GO / NO GO GO / NO GO

Problem: Used half stadia method for flank  
target; should have used full stadia.

GO / NO GO GO / NO GO

Correction: Determine if student recognizes  
target as flank.

GO / NO GO GO / NO GO

Repeat full stadia rule and/or  
illustrate rule again.

GO / NO GO GO / NO GO

Did instructor state there was no error in 1C? GO / NO GO GO / NO GO

\*Did instructor identify error in 1D? GO / NO GO GO / NO GO

Problem: Used full stadia method for GO / NO GO GO / NO GO

frontal target; should have used half stadia

Correction: Determine if student recognizes target as frontal. GO / NO GO GO / NO GO

Repeat half stadia rule and/or illustrate rule again. GO / NO GO GO / NO GO

\*[If instructor stated no error in 1D, because when a frontal target extends beyond the two stadia lines, the half stadia method provides the same results, then the instructor should be given a GO for this target. Passing score would then be 16 out of 20.]

### 3. ILLUSTRATION #2 (Target scenes).

\*Did instructor identify error in 2A? GO / NO GO GO / NO GO

Problem: Target out of range and therefore GO / NO GO GO / NO GO

not engageable; student said target was engageable.

Correction: Remind student to check whether target is within range first. If it is GO / NO GO GO / NO GO

out of range it is automatically not engageable.

\*[Instructor must use ruler or other means to determine if target is within range.]

Did instructor state there was no error in 2B? GO / NO GO GO / NO GO

Did instructor identify error in 2C? GO / NO GO GO / NO GO

Problem: Inappropriate placement of sight GO / NO GO GO / NO GO

picture (opposite direction of vehicle movement).

Correction: Remind student to place the GO / NO GO GO / NO GO

edge of the sight picture on the front of the target to inspect anticipated path of vehicle.

---

#### SCORE

Passing score is 18 and above.

# GOs \_\_\_\_\_ # GOs \_\_\_\_\_  
Pass/Fail Pass/Fail

Note. If answered 1D as "no error," passing score is 16 and above. If this is the case, the only item scored is whether instructor identified error in 1D.

TEST BOOKLET

DRAGON INSTRUCTOR CERTIFICATION

DETERMINE IF TARGET IS ENGAGEABLE WITH DRAGON

(DIAGNOSING STUDENT ERRORS AND PROVIDING CORRECTIVE FEEDBACK)

\*\*\*\*\*

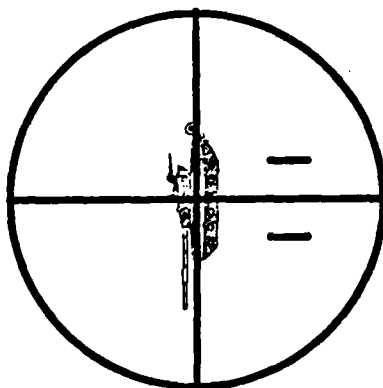
SITUATION: Student seemed to understand engageability rules during initial instruction, but makes errors on more than half the targets on the test in the mini-village. There is no consistency in the errors.

QUESTION: Why is the student having this problem? Be as specific as possible with your answer.

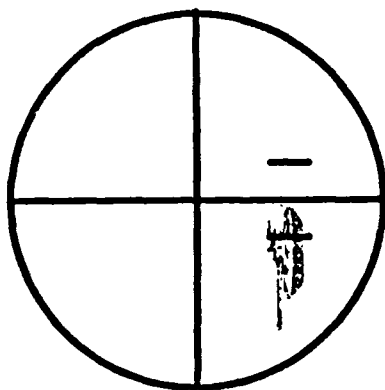
QUESTION: What would you do to correct the student so the problem would not happen again?

\*\*\*\*\*

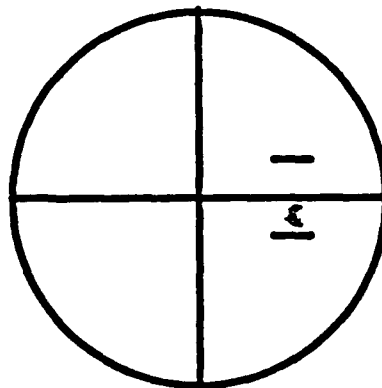
# Illustration #1



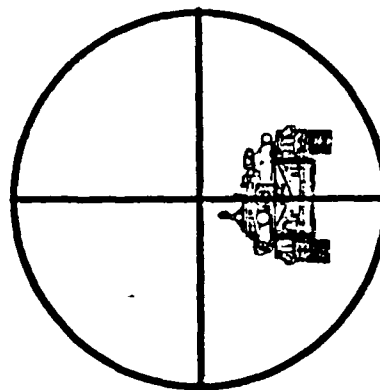
1A



1B



1C

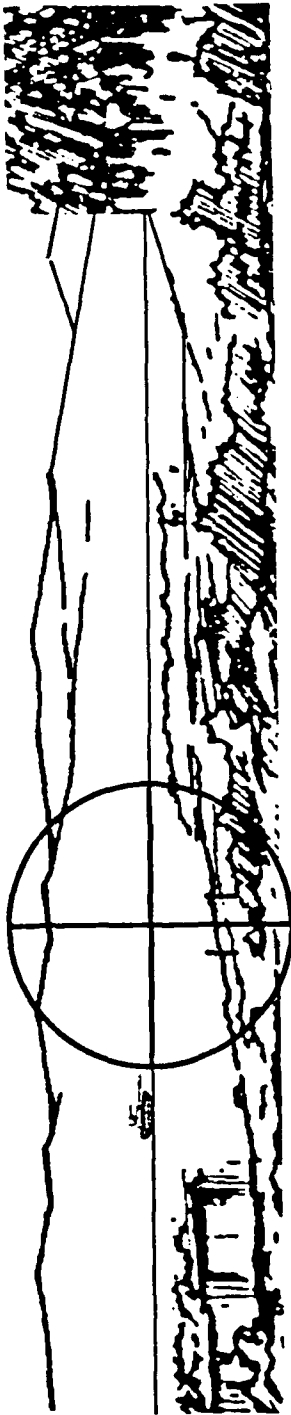


1D

In which situations did the student make an error?

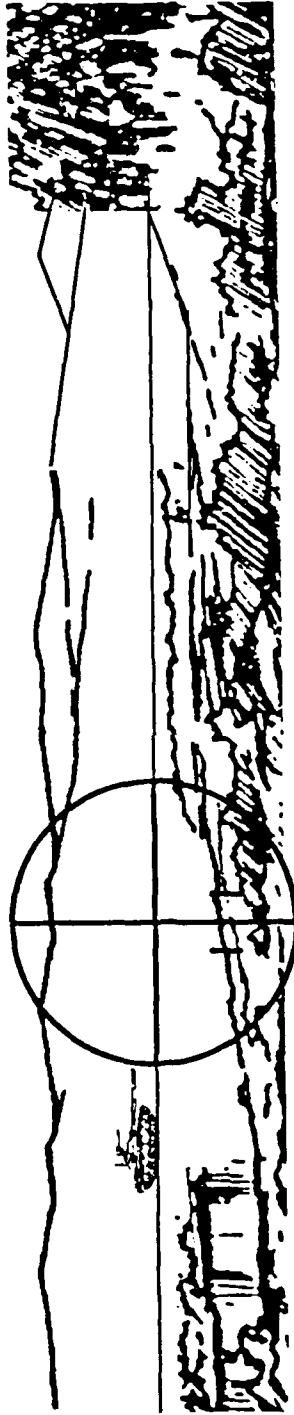
Describe the error made by the student in each situation and what you would do to correct the error.

## Illustration #2



Student said  
target was  
engageable.

2A



Student said  
target was  
engageable.

2B



Student  
said target  
was not  
engageable.

2C

In which situations did the student make an error?

Describe the error made by the student in each situation and what you would do to correct the error.

APPENDIX E

INSTRUCTOR CERTIFICATION TRAINING MATERIALS:

PREPARE AN ANTIARMOR RANGE CARD

## DRAGON INSTRUCTOR CERTIFICATION PROGRAM

Training objective: Prepare an antiarmor range card.

Conditions: During daylight, given an antiarmor weapon system, a designated firing position, a sector of fire, target reference data, DA Form 5517-R, pencil, protractor (GTA 5-2-12), and compass.

Standards: Prepare a range card that includes a data section and a sketch section of the sector of fire, with appropriate sketches and military symbols.

### REQUIRED TRAINING AIDS

Butcher paper or chalk board  
Minivillage  
Compass mock-up  
Compass for each instructor  
Protractor (GTA 5-2-12) for each instructor

### TRAINING TIPS

State purpose of block of instruction.

This tells the student what he must be able to do.

Define/clarify key terms/concepts.

Acronyms are a common part of this task. Make sure they are known and clearly understood. Additionally, there are many parts to the range card, which tax the memory.

Present rule(s)

This task uses rules which are not unique to antiarmor weapons, those which should have been learned previously (for example, back azimuth). Do not assume they have been learned and can be applied to a new situation. Remember to review the rules thoroughly.

Provide practice

Students learn when they are presented varied practice situations. Vary distances, azimuths, and/or reference points, or vary the terrain on which they practice.

Feedback

Feedback allows students the opportunity to learn from their mistakes. If a practice exercise is given, then take the time to grade it and allow the student time to review the corrected exercise.

Teach

Provide a logical order to the ten required parts of the range card. Explain to the students what the order is, and why the order should be followed.

\*\*\*\*\*

1. State purpose of block of instruction.

To prepare an antiarmor range card.

Instructor's note: Explain the importance and purpose of a range card. Additionally, explain or identify the common elements (that is, used for all direct fire weapons, all will have a direction, range, and description, etc.) across weapon systems.

2. Define/clarify key terms/concepts

Sector of fire

Left limit

Right limit

Maximum engagement line (max eng line)

Gunner reference point (GRP)

Back azimuth

Anticipated target engagement areas (ATEA)

Target reference point (TRP)

Dead space

Dragon weapon symbol

Magnetic north

Marginal information

Unit (not above company)

Primary (alternate or supplementary) position identification

Date

Time

Meter equivalent

Instructor's notes: This is a lot of information, with acronyms and abbreviations. Provide the students with a strategy to remember and accurately record all the information on the range card. An approach to simplifying the transfer of information from the top of the form to the bottom is to work back and forth between the two halves. That is, when number 1 (left limit) is identified and circled on the sector sketch, move to the bottom of the form and supply the information in the data section. Continue this until all information is supplied.

Another approach may be to fill in all the known information (marginal information, weapon symbol, meter equivalent, etc.) first. Then progress to the sector sketch and data section information.

Provide logic for the information which is used on the range card. The reason the weapon symbol is used rather than the word "Dragon" is not so the Threat will not understand the information, but because the symbol is a universal NATO symbol for medium distance antitank weapons.



### 3. Present rules

Slowly and clearly explain how to determine a back azimuth. Math skills are also important for determining the meters between circles.

Instructor's notes: Remember that not all students have good math skills. Take your time. Show and explain to the students how you determined the back azimuth as well as the division for determining the distance between circles.

### 4. Provide practice

When practicing this task, the demonstration example should be different from the practice example(s), which in turn, should differ from the test example; vary azimuths, distances, and reference points, or the terrain on which the task is practiced.

Instructor's notes: The student has many and varied things to do to successfully complete this task. He must have math skills, the ability to mentally picture the minivillage so it can be drawn, compass skills, as well as the knowledge of all the elements. Make sure there is time for two practice exercises.

When you use the minivillage for your examples and the test, change the location of the ATEA and TRP. Change the azimuths of the left and right limits, as well as the distance to the village from the gunners location. For the test, use the actual azimuths and allow the students to use the compass which has been issued to the instructor.

Use another piece of terrain for practice. The range card could be drawn from the LET firing position to down range. Make the exercise realistic.

### 5. Feedback

The student needs thorough feedback after each practice trial, because of the many elements in this task.

Instructor's notes: Grade the practice trials as you would the test trial, mark all errors. Ask the student if he knows why the error is an error. Explain to him and the other students in the group why the error is an error.

APPENDIX F

INSTRUCTOR CERTIFICATION TEST:  
PREPARE AN ANTIARMOR RANGE CARD

# INSTRUCTOR CERTIFICATION TEST FOR PREPARE AN ANTIARMOR RANGE CARD

## 1. Assessment of ability to instruct

Instructor objective: Instruct students on how to prepare an antiarmor range card.

Conditions: Given a chalkboard, chalk, DA Form 5517-R, a compass, protractor (GTA 5-2-12), and audience.

Standards: Instruct student to properly prepare and use an antiarmor range card. The instructor has two attempts to successfully complete this task. Instruction must include the following parts:

Instructor: \_\_\_\_\_ Date: \_\_\_\_\_

|  | Trial 1   | Trial 2   |
|--|-----------|-----------|
| State purpose of block of instruction.     | GO / NOGO | GO / NOGO |
| Clear (understandable) sector sketch       | GO / NOGO | GO / NOGO |
| Clear definition of terms:                 |           |           |
| Sector of fire                             | GO / NOGO | GO / NOGO |
| Left limit                                 | GO / NOGO | GO / NOGO |
| Right limit                                | GO / NOGO | GO / NOGO |
| Maximum engagement line                    | GO / NOGO | GO / NOGO |
| Gunner reference point (GRP)               | GO / NOGO | GO / NOGO |
| Back azimuth                               | GO / NOGO | GO / NOGO |
| Anticipated target engagement areas (ATEA) | GO / NOGO | GO / NOGO |
| Target reference point (TRP)               | GO / NOGO | GO / NOGO |
| Dead space                                 | GO / NOGO | GO / NOGO |
| Dragon weapon symbol                       | GO / NOGO | GO / NOGO |
| Magnetic north                             | GO / NOGO | GO / NOGO |
| Marginal information                       |           |           |
| Unit (not above company)                   | GO / NOGO | GO / NOGO |
| Primary (alternate or supplementary)       |           |           |
| position identification                    | GO / NOGO | GO / NOGO |
| Date                                       | GO / NOGO | GO / NOGO |
| Time                                       | GO / NOGO | GO / NOGO |
| Meter equivalent                           | GO / NOGO | GO / NOGO |

2. Assessment of ability to identify student errors, analyze reason for error and correct.

Instructor objective: To analyze, evaluate and correct student performance on preparing an antiarmor range card.

Condition: Given 5 Dragon range cards and pencil.

Standard: Identify and correct all the errors on the test range cards. The instructor will have two trials to successfully complete this task.

Test problems (with answers):

|  | Trial 1   | Trial 2   |
|--|-----------|-----------|
| 1. Range card #1.  |           |           |
| Errors on range card:  |           |           |
| Magnetic north arrow pointing in wrong direction.  | GO / NOGO | GO / NOGO |
| Dead space not drawn for all areas.  | GO / NOGO | GO / NOGO |
| Maximum engagement line is not labeled properly.   | GO / NOGO | GO / NOGO |
| Correction of errors:  |           |           |
| Gunner should be reminded that the magnetic north arrow must be drawn relative to the azimuths provided for the left and right limit. Provide another (different) example. (Note: A protractor may be an appropriate training aid if this is a persistent problem. Another technique is to draw a circle and place the left and right limits at their appropriate azimuths to show where magnetic north would be.) | GO / NOGO | GO / NOGO |
| Explain the purpose for identifying dead space and how it is determined. The gunner can not engage a target if dead space is in the anticipated target engagement area.  | GO / NOGO | GO / NOGO |
| Explain that although the maximum effective distance is 1000 m, the 1000 m line is marked as the maximum engagement line because targets can not be <u>engaged</u> beyond that point.  | GO / NOGO | GO / NOGO |

## 2. Range Card #2.

### Errors on range card:

Circle to meter conversion, thus  
all distances are incorrect  
(except left and right limits).  
Dragon weapon symbol incorrect.

GO / NOGO    GO / NOGO  
GO / NOGO    GO / NOGO

### Correction of errors:

This is confusing. The form would be  
much easier to use if there were 10 lines  
rather than nine. Do the long division  
on the chalkboard. Divide 1000 m (max  
engagement by 9 (number of lines).  
The answer is 111.11.

GO / NOGO    GO / NOGO

Remind students that care must be taken  
when drawing the symbol. The cross hairs  
do not touch sides of the inverted U.

GO / NOGO    GO / NOGO

## 3. Range Card #3.

### Errors on range card:

Higher than company level is given.  
"Dragon" is written rather than symbol.  
Known point azimuth is incorrect.

GO / NOGO    GO / NOGO  
GO / NOGO    GO / NOGO  
GO / NOGO    GO / NOGO

### Correction of errors:

Only company level and below identification  
are given on the range card to prevent  
the threat from having too much tactical  
information.

GO / NOGO    GO / NOGO

The Dragon weapon symbol is a universal  
NATO symbol for medium distance  
antitank weapon.

GO / NOGO    GO / NOGO

The back azimuth is given as the direction  
to the known point. Improper calculation  
of back azimuth or not calculating it will  
lead to supplies and ammunition not being  
delivered. Review the math involved with  
calculating the back azimuth. Provide the  
students with several problems.

GO / NOGO    GO / NOGO

4. Range Card #4.

Errors on range card:

Numbers not ordered properly.  
Known point azimuth is incorrect.

GO / NOGO    GO / NOGO  
GO / NOGO    GO / NOGO

Correction of errors:

All information is labeled from left to right in groups; that is left and right limits, then ATEAs, then TRPs and finally the GRP.

GO / NOGO    GO / NOGO

The back azimuth is given as the direction to the known point. Improper calculation of back azimuth or not calculating it will lead to supplies and ammunition not being delivered. Review the math involved with calculating the back azimuth. Provide the students with several problems.

GO / NOGO    GO / NOGO

5. Range Card #5.

Errors on range card:

No marginal information.  
Sector sketch has no numbers.  
Left and right limit azimuths have been reversed, all other azimuths have been reversed.  
Arrows pointing in wrong direction on GRP.

GO / NOGO    GO / NOGO  
GO / NOGO    GO / NOGO

GO / NOGO    GO / NOGO

GO / NOGO    GO / NOGO

Correction of errors:

Remind student the marginal information provides identification information on the range card since a copy of the card will be forwarded to a higher command. Additionally, the magnetic north is a vital part of any direction-giving information.

GO / NOGO    GO / NOGO

The sector sketch must be numbered to correspond to the information in the data section. (Note: an approach to simplify this transfer of information from the top of the form to the bottom is to work back and forth between the two halves. That is, when 1 is identified and circled on the sector sketch, move to the bottom of the form and supply the information in the data section. Continue this until all information is supplied.)

GO / NOGO    GO / NOGO

The gunner obviously had problems reading his compass or protractor. Re-explain the principle of 360 degrees representing a circle. This gunner may require some individualized instruction.

GO / NOGO    GO / NOGO

The arrow to the GRP is pointed from the known point to the GRP. The gunner wants supplies coming to him, not away.

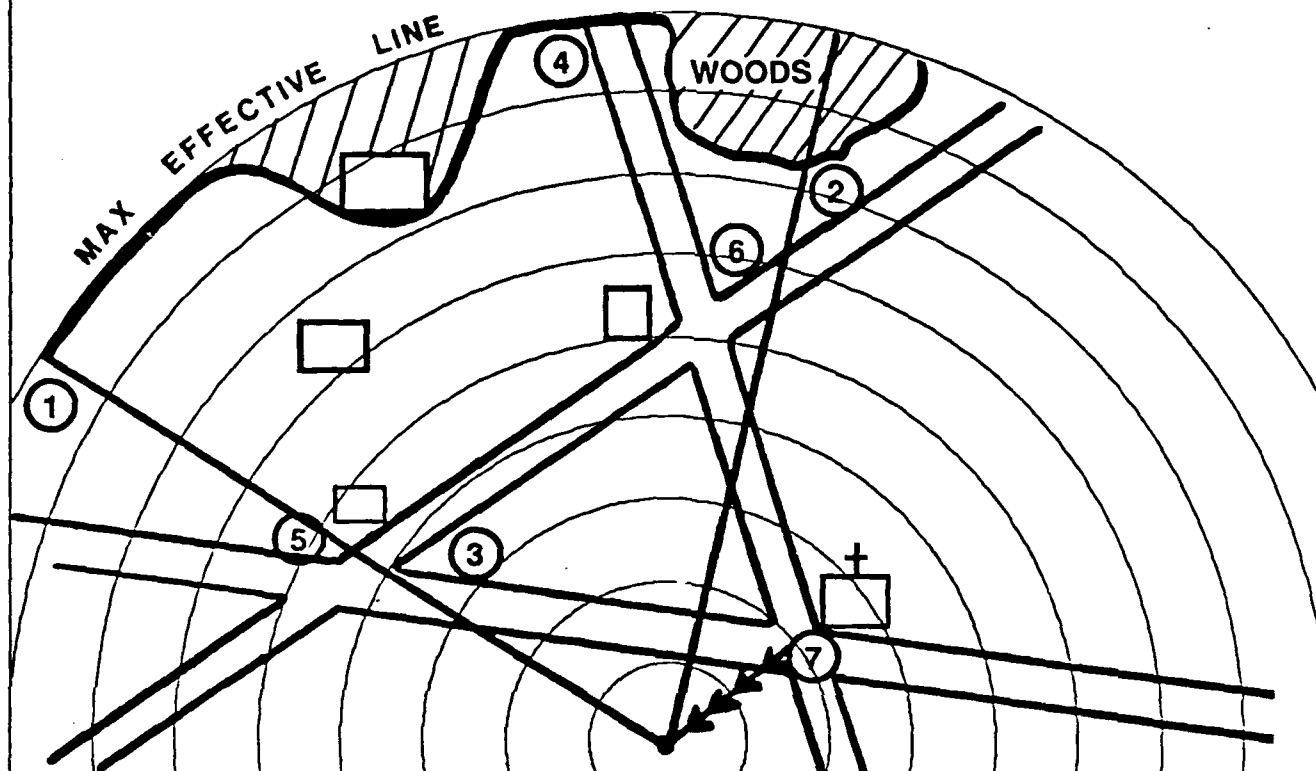
GO / NOGO    GO / NOGO

# STANDARD RANGE CARD

SQD 3  
PLT 2  
CO B

May be used for all types of direct fire weapons

  
MAGNETIC  
NORTH



## DATA SECTION

POSITION IDENTIFICATION

PRIMARY

DATE

1700 HRS 12 JAN 89

WEAPON



EACH CIRCLE EQUALS \_\_\_\_\_  
METERS

111

| NO. | DIRECTION/<br>DEFLECTION | ELEVATION | RANGE  | AMMO | DESCRIPTION         |
|-----|--------------------------|-----------|--------|------|---------------------|
| 1   | 122°                     | /         | 1000 m | /    | LEFT LIMIT          |
| 2   | 194°                     |           | 800 m  |      | RIGHT LIMIT         |
| 3   | 115°                     |           | 460 m  |      | ATEA #1             |
| 4   | 175°                     |           | 1000 m |      | ATEA #2             |
| 5   | 115°                     |           | 460 m  |      | TRPA1 ROAD JUNCTION |
| 6   | 185°                     |           | 570 m  |      | TRPA2 ROAD JUNCTION |

REMARKS:

7

50°

222 m

KNOWN POINT  
ROAD JUNCTION

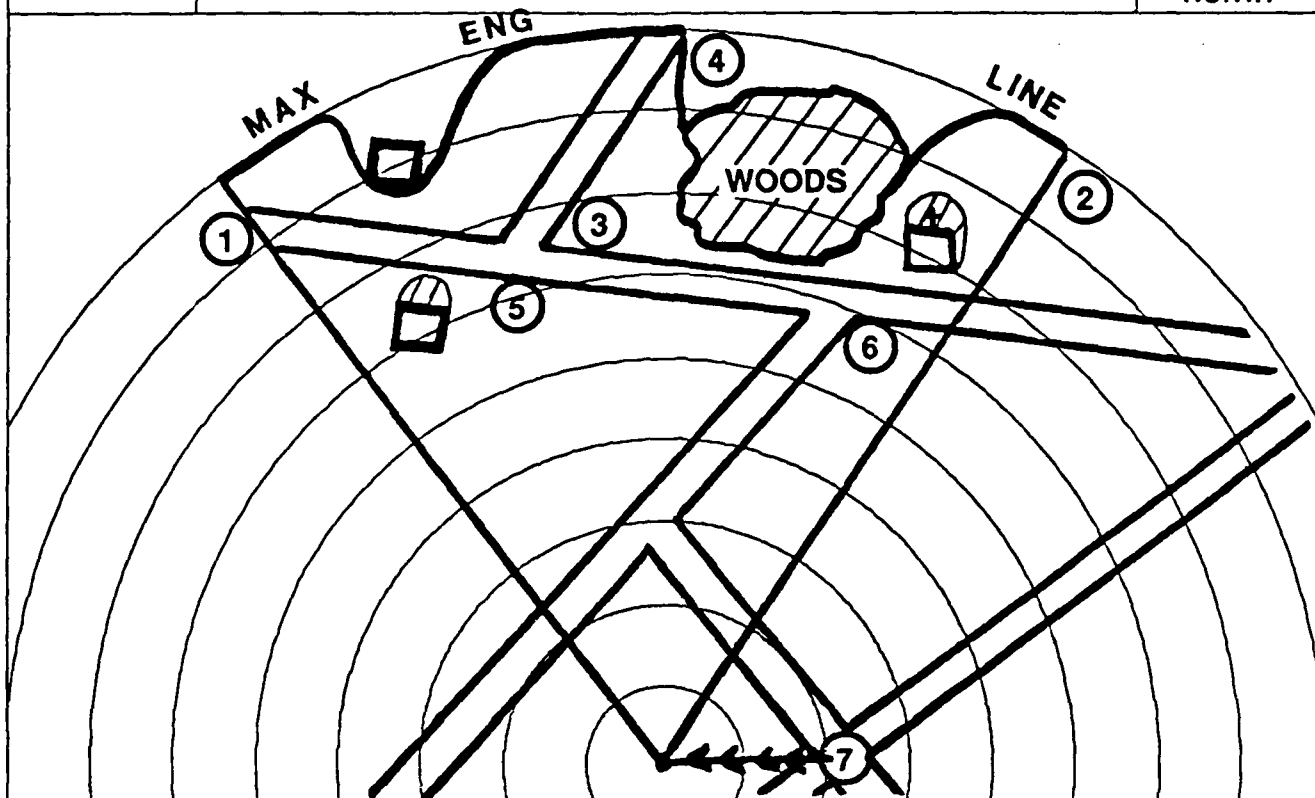


# STANDARD RANGE CARD

SQD 3  
PLT 2  
CO A

May be used for all types of direct fire weapons

MAGNETIC  
NORTH



## DATA SECTION

POSITION IDENTIFICATION

PRIMARY

DATE

1500 HRS 15 JAN 89

WEAPON



EACH CIRCLE EQUALS  
METERS

100

| NO. | DIRECTION/<br>DEFLECTION | ELEVATION | RANGE  | AMMO | DESCRIPTION         |
|-----|--------------------------|-----------|--------|------|---------------------|
| 1   | 232°                     |           | 1000 m |      | LEFT LIMIT          |
| 2   | 305°                     |           | 1000 m |      | RIGHT LIMIT         |
| 3   | 257°                     |           | 750 m  |      | ATEA #1             |
| 4   | 272°                     |           | 1000 m |      | ATEA #2             |
| 5   | 257°                     |           | 750 m  |      | TRPB1 ROAD JUNCTION |
| 6   | 295°                     |           | 700 m  |      | TRPB2 ROAD JUNCTION |

REMARKS:

7

180°

300 m

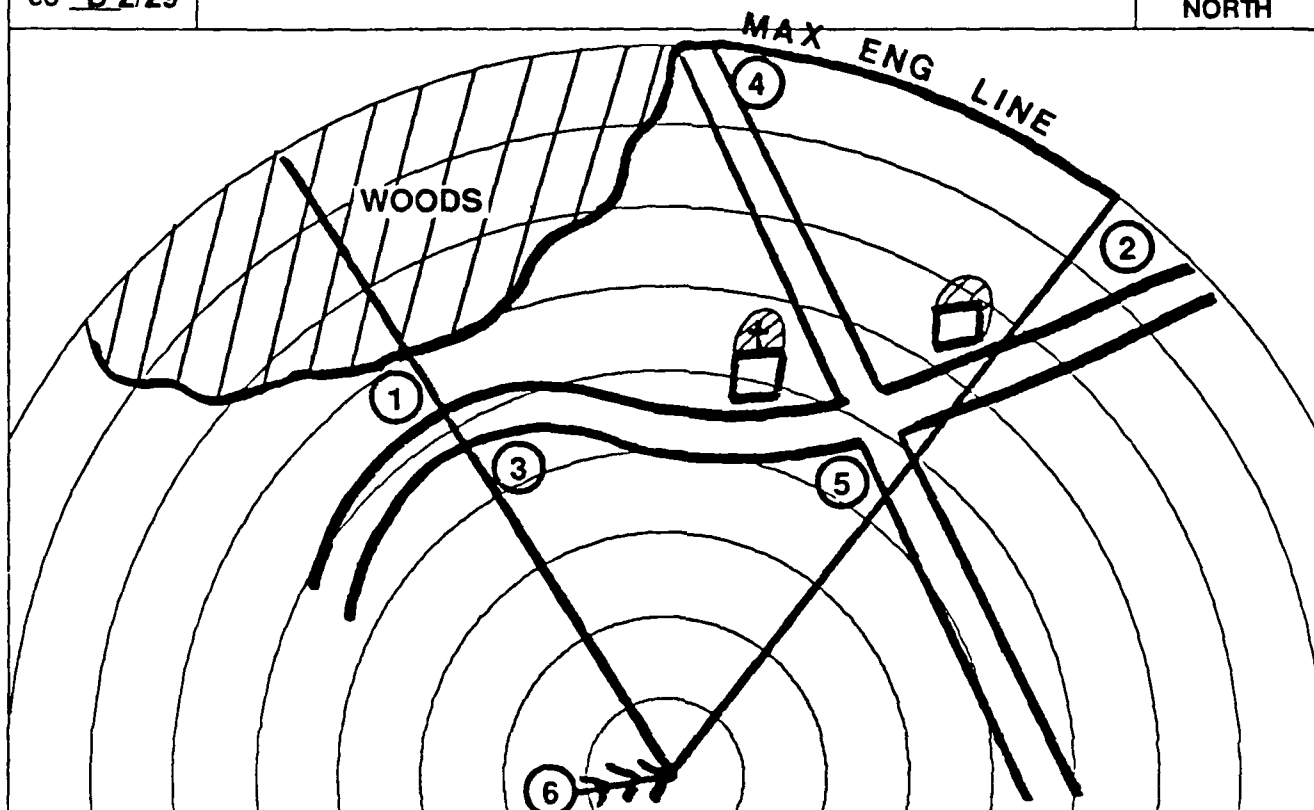
KNOWN POINT  
ROAD JUNCTION

# STANDARD RANGE CARD

SQD 1  
PLT 1  
CO B 2/29

May be used for all types of direct fire weapons

MAGNETIC  
NORTH



## DATA SECTION

POSITION IDENTIFICATION

PRIMARY

DATE

1300 HRS 20 JAN 89

WEAPON

DRAGON

EACH CIRCLE EQUALS  
METERS

111

| NO. | DIRECTION/<br>DEFLECTION | ELEVATION | RANGE  | AMMO | DESCRIPTION          |
|-----|--------------------------|-----------|--------|------|----------------------|
| 1   | 0°                       |           | 666 m  |      | LEFT LIMIT           |
| 2   | 72°                      |           | 1000 m |      | RIGHT LIMIT          |
| 3   | 0°                       |           | 555 m  |      | ATEA #1              |
| 4   | 35°                      |           | 1000 m |      | ATEA #2              |
| 5   | 60°                      |           | 555 m  |      | TRPA1                |
| 6   | 305°                     |           | 140 m  |      | KNOWN POINT HILL TOP |

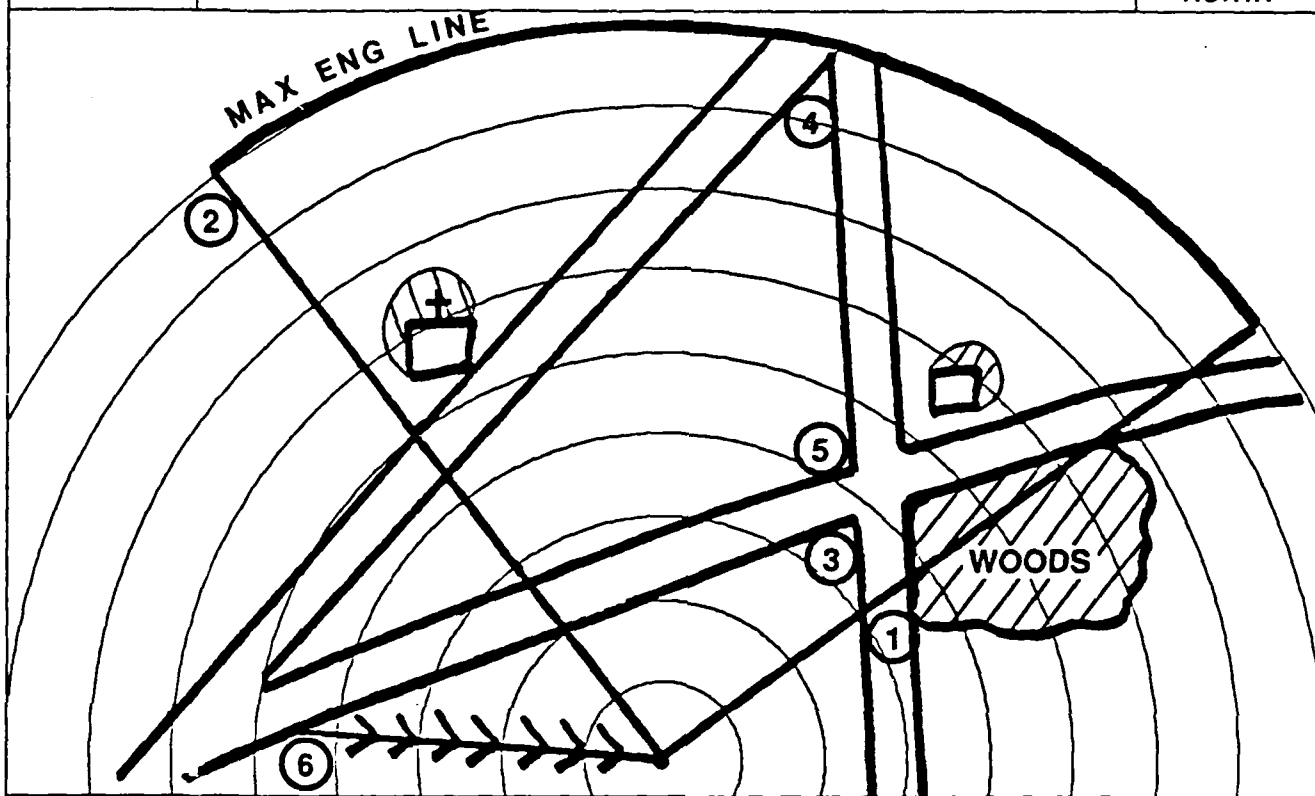
REMARKS:

# STANDARD RANGE CARD

SQD 1  
PLT 2  
CO A

May be used for all types of direct fire weapons

MAGNETIC  
NORTH



## DATA SECTION

POSITION IDENTIFICATION

PRIMARY

DATE

1000 HRS 10 JAN 89

WEAPON



EACH CIRCLE EQUALS  
METERS

111

| NO. | DIRECTION/<br>DEFLECTION | ELEVATION | RANGE  | AMMO | DESCRIPTION                  |
|-----|--------------------------|-----------|--------|------|------------------------------|
| 1   | 295°                     |           | 1000 m |      | RIGHT LIMIT                  |
| 2   | 25°                      |           | 400 m  |      | LEFT LIMIT                   |
| 3   | 10°                      |           | 400 m  |      | ATEA #1                      |
| 4   | 345°                     |           | 1000 m |      | ATEA #2                      |
| 5   | 10°                      |           | 400 m  |      | TRPA1 ROAD JUNCTION          |
| 6   | 245°                     |           | 555 m  |      | KNOWN POINT<br>ROAD JUNCTION |

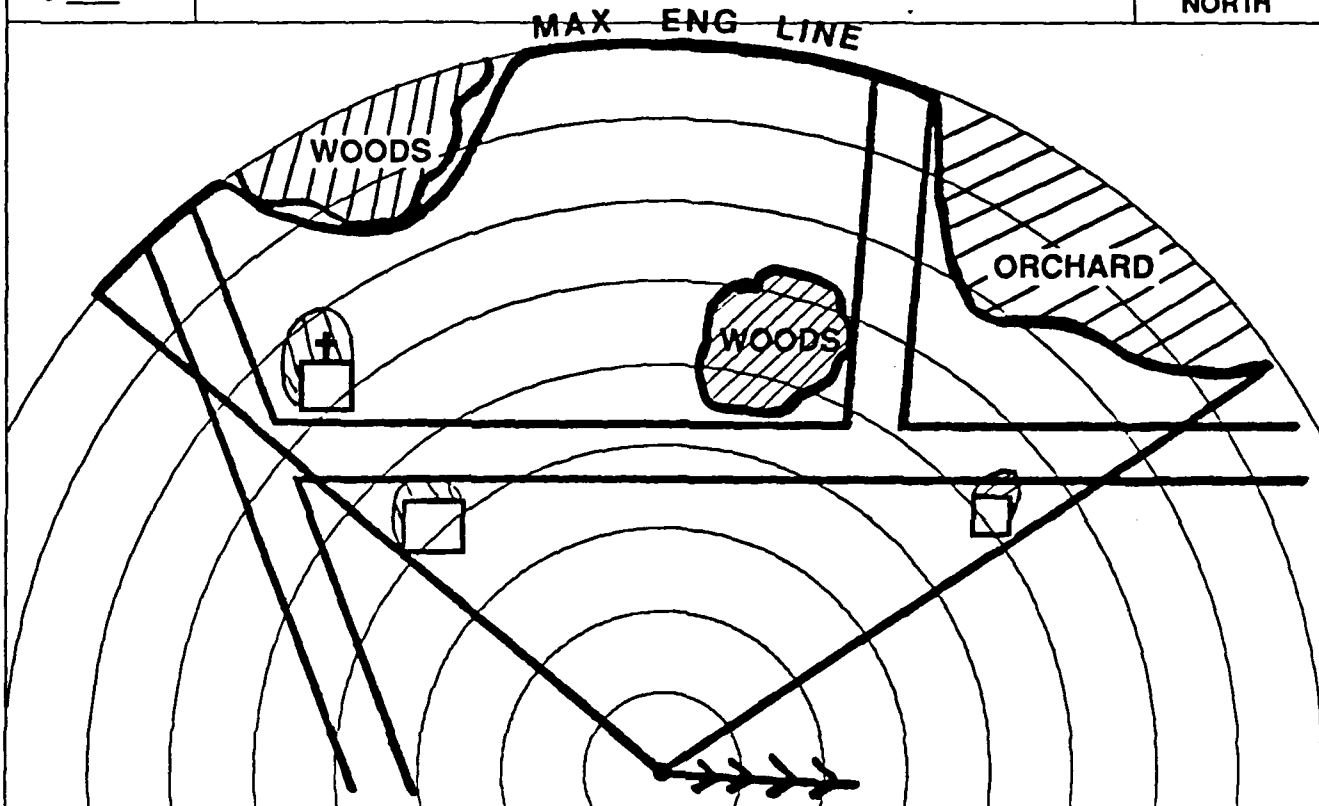
REMARKS:

# STANDARD RANGE CARD

SOD \_\_\_\_\_  
PLT \_\_\_\_\_  
CO \_\_\_\_\_

May be used for all types of direct fire weapons

MAGNETIC  
NORTH



## DATA SECTION

POSITION IDENTIFICATION

PRIMARY

DATE

0800 HRS 10 JAN 89

WEAPON



EACH CIRCLE EQUALS  
METERS

111

| NO. | DIRECTION/<br>DEFLECTION | ELEVATION | RANGE  | AMMO | DESCRIPTION         |
|-----|--------------------------|-----------|--------|------|---------------------|
| 1   | 55°                      |           | 1000 m |      | LEFT LIMIT          |
| 2   | 310°                     |           | 1000 m |      | RIGHT LIMIT         |
| 3   | 55°                      |           | 666 m  |      | ATEA #1             |
| 4   | 335°                     |           | 555 m  |      | ATEA #2             |
| 5   | 55°                      |           | 666 m  |      | TRPA1 ROAD JUNCTION |
| 6   | 335°                     |           | 555 m  |      | TRPA2 ROAD JUNCTION |

REMARKS:

7

270°

270 m

KNOWN POINT HILL TOP

## APPENDIX G

### INSTRUCTOR CERTIFICATION TRAINING MATERIALS: PERFORM MALFUNCTION PROCEDURES

## INSTRUCTOR TRAINING MATERIALS: MALFUNCTIONS

### NOTES FOR INSTRUCTOR

1. Explain the importance of immediate actions procedures to the students.

A malfunction is the failure of ammunition to function correctly when fired. During normal operation of the Dragon, a malfunction occurs if the missile fails to launch after the trigger is squeezed. There are two types of malfunctions that require the Dragon gunner to take immediate action, "HANGFIRE" and "MISFIRE."

2. Explain the importance of calling out "MISFIRE" and what the term "MISFIRE" indicates.

When your M47 Dragon medium antitank weapon malfunctions the gunner calls out "MISFIRE" to warn everyone in the area that:

- A) the missile didn't fire
- B) there is a problem which could be dangerous

3. Explain the difference between "HANGFIRE" and "MISFIRE."

A "HANGFIRE" is an unexpected delay in the functioning of a series of ammunition components. If the missile fails to fire after the trigger level bar is squeezed, and the tracker battery is "HOT" the malfunction is "HANGFIRE."

A "MISFIRE" (complete failure to fire) occurs if the launch motor fails to ignite after the trigger bar is squeezed. This type of malfunction may be caused by a faulty firing circuit, a failure of electrical power, poor electrical connections, short circuits, or by faulty components in the ignition or propellant systems. If the missile fails to fire after the trigger level bar is squeezed, and the tracker battery is "COLD," the malfunction is "MISFIRE."

Diagnose the cause of the malfunction by determining whether the tracker battery is "HOT" or "COLD" after the missile fails to fire.

4. Explain the difference between "HANGFIRE" and "MISFIRE" procedures.

Explain the HANGFIRE (HOT battery) first:

A) A HANGFIRE (HOT battery) means an electrical connection has been made but the MISSILE DID NOT FIRE. THIS IS A POTENTIALLY DANGEROUS CONDITION.

B) The IMMEDIATE ACTION for a HANGFIRE (HOT battery) contains fewer steps than the IMMEDIATE ACTION for a MISFIRE (COLD battery).

C) The IMMEDIATE ACTION for a MISFIRE (COLD battery) contains the same steps as for the HANGFIRE (HOT battery), with a few more added.

5 Simplify the task.

Use the training aid illustrated below.

Identify the major steps in the immediate action procedures.

HANGFIRE PROCEDURE HAS THREE MAJOR STEPS:

- A) Squeeze trigger again
- B) Check battery
- C) Remove and replace round

MISFIRE PROCEDURE HAS SEVEN MAJOR STEPS:

- A) Squeeze trigger again
- B) Check battery
- C) Reseat tracker, squeeze trigger and recheck battery
- D) Remove and replace round
- E) Squeeze trigger again
- F) Check battery
- G) Remove defective tracker

6. Demonstrate the HANGFIRE task first, and allow student to practice before demonstrating MISFIRE procedure.

- A) Potentially most dangerous because charge has activated the battery.
- B) Fewer steps than MISFIRE procedure.
- C) After learning HANGFIRE procedure, students have only two additional steps to learn to perform MISFIRE procedure.
- D) Observe students and give immediate feedback when errors are made.

7. Demonstrate the MISFIRE procedure and allow for student practice. Observe students and give immediate feedback when errors are made.

## TRAINING AID

### DRAGON FAILS TO FIRE

#### INSTRUCTOR CHOOSES CONDITION

---

#### MISFIRE - COLD BATTERY

Squeeze trigger again and  
track for 15 seconds.

ROUND STILL DOES  
NOT FIRE

Release trigger;  
Sound off "MISFIRE"

Support round on shoulder  
with left hand under round.  
Turn head to see tracker  
battery.  
Cautiously feel in vicinity  
of battery with right hand.

CAUTION: DO NOT  
TOUCH BATTERY ---  
BURN TO HAND MAY  
RESULT

Remove round from  
shoulder and gently set it  
on the ground.

#### HANGFIRE - HOT BATTERY

Squeeze trigger again and  
track for 15 seconds.

ROUND STILL DOES  
NOT FIRE

Release trigger;  
Sound off "MISFIRE"

Support round on shoulder  
with left hand under round.  
Turn head to see tracker  
battery.  
Cautiously feel in vicinity  
of battery with right hand.

CAUTION DO NOT  
TOUCH BATTERY ---  
BURN TO HAND MAY  
RESULT

Remove round from  
shoulder and gently set it  
on the ground.

#### INSTRUCTOR NOTES

##### EXPLAIN

- o Tracker may not  
function properly

- o Round may be defective

##### DEMONSTRATE

- o Show the student the  
location of the battery

- o Show the student where  
to place hand to get proper  
feedback without touching  
the battery



**MISFIRE - COLD  
BATTERY**

**RESEAT TRACKER**

Release tracker.  
Move it forward until the  
electrical connectors break  
contact.  
Apply downward pressure.  
Reseat tracker to round.  
Place round back on  
shoulder.  
Acquire previous target;  
sound off "I am continuing  
with the mission."  
Squeeze trigger lever bar

**ROUND STILL DOES  
NOT FIRE**

Release trigger.  
Support round on shoulder  
with left hand under round.  
Turn head to see tracker  
battery.  
Cautiously feel in vicinity  
of battery with right hand.

**BATTERY STILL COLD**

**REMOVE TRACKER  
FROM ROUND**

Carry round safe distance  
from position.  
Keep round pointed toward  
the enemy.

**HANGFIRE - HOT  
BATTERY**

**REMOVE TRACKER  
FROM ROUND**

Carry round safe distance  
from position.  
Keep round pointed toward  
the enemy.

**INSTRUCTOR NOTES**

**DEMONSTRATE**

- o Show the student how  
to release tracker.
- o Show the student the  
electrical connectors.
- o Demonstrate reseating  
the tracker.

**MEMORY CUE**

- o When removing round  
from the tracker, clearly  
define what constitutes a  
"safe distance" from the  
position.
- o A "safe distance" is  
defined in the Company  
SOP.

**MISFIRE - COLD  
BATTERY**

**OBTAIN ANOTHER  
ROUND**

Mount tracker on new round.  
Acquire previous or new target.  
Sound off "I am continuing with the mission."  
Squeeze trigger lever bar.

**IF SECOND ROUND  
DOES NOT FIRE**

Support round on shoulder with left hand under round.  
Turn head to see tracker battery.  
Cautiously feel in vicinity of battery with right hand.

**IF BATTERY IS STILL  
COLD, TRACKER IS  
PROBABLY DEFECTIVE**

Remove tracker from round.  
Place tracker in carrying bag.  
Take to squad leader.  
Await further instruction.

**HANGFIRE - HOT  
BATTERY**

**OBTAIN ANOTHER  
ROUND**

Mount tracker on new round.  
Acquire a previous or new target.  
Sound off "I am continuing with the mission."  
Squeeze trigger level bar.

**INSTRUCTOR NOTES**

**REMIND STUDENTS:**

This means the tracker was bad.

## APPENDIX H

### INSTRUCTOR CERTIFICATION TEST: PERFORM MALFUNCTION PROCEDURES

## ASSESSMENT OF ABILITY TO INSTRUCT: MALFUNCTIONS

### INSTRUCTOR OBJECTIVE

Demonstrate to students how to perform immediate action procedures with the M47 medium antitank weapon system (Dragon) with day tracker.

### CONDITIONS

Given Dragon day tracker, field handling trainer (FHT), and an audience.

### STANDARDS

Instruction must correspond to the steps listed on pages 3-5, and the critical points listed on page 5 must be mentioned. The instructor must get all steps correct within two trials.

### TESTING PROCEDURE

The instructor will demonstrate immediate action procedures to the other NCOs in the course or to the instructor. The observation form on pages 3-5 will be used.

Instructor: \_\_\_\_\_

Date: \_\_\_\_\_

**PERFORM IMMEDIATE ACTION PROCEDURES ON  
AN M47 DRAGON MEDIUM ANTITANK WEAPON**

| Content   | Trial 1 |      | Trial 2 |      |
|---|---------|------|---------|------|
|   | GO      | NOGO | GO      | NOGO |
| 1 Dragon fails to fire  |         |      |         |      |
| HOT BATTERY:  |         |      |         |      |
| 2 Resqueeze the trigger.  |         |      |         |      |
| 3 Continue to track for 15 sec.                                 |         |      |         |      |
| 4 Trigger must be depressed for the 15 sec.                     |         |      |         |      |
| 5 Gunner told not to touch the battery.                         |         |      |         |      |
| IF THE ROUND STILL DOES NOT FIRE:                               |         |      |         |      |
| 6 Release trigger.  |         |      |         |      |
| 7 Sound off "MISFIRE."  |         |      |         |      |
| 8 Support round on shoulder with left hand under round.         |         |      |         |      |
| 9 Turn head to see tracker battery.                             |         |      |         |      |
| 10 With right hand, feel in the vicinity of tracker battery.    |         |      |         |      |
| 11 Remove round from shoulder.                                  |         |      |         |      |
| 12 Gently set it on the ground.                                 |         |      |         |      |
| 13 Remove tracker from round.                                   |         |      |         |      |
| 14 Place round on ground, a safe distance from firing position. |         |      |         |      |
| 15 Keep round pointed toward enemy.                             |         |      |         |      |
| 16 Obtain other round.  |         |      |         |      |
| 17 Mount tracker on new round.                                  |         |      |         |      |
| 18 Acquire previous or new target.                              |         |      |         |      |
| 19 Sound off "I am continuing with the mission."                |         |      |         |      |
| 20 Squeeze trigger lever bar.                                   |         |      |         |      |
| 21 Dragon fails to fire.  |         |      |         |      |
| COLD BATTERY  |         |      |         |      |
| 22 Immediately resqueeze trigger.                               |         |      |         |      |
| 23 Continue tracking for 15 sec.                                |         |      |         |      |
| 24 Trigger is depressed throughout 15 sec.                      |         |      |         |      |
| 25 Do not touch the battery.                                    |         |      |         |      |

| Content |  | Trial 1 |      | Trial 2 |      |
|---------|--|---------|------|---------|------|
|         |  | GO      | NOGO | GO      | NOGO |
|         | IF ROUND STILL DOES NOT FIRE:                                  |         |      |         |      |
| 26      | Release trigger.   |         |      |         |      |
| 27      | Sound off "MISFIRE".   |         |      |         |      |
| 28      | Support round with left hand.                                  |         |      |         |      |
| 29      | Turn head to see tracker battery.                              |         |      |         |      |
| 30      | Cautiously feel in vicinity of battery.                        |         |      |         |      |
| 31      | Remove round from shoulder.                                    |         |      |         |      |
| 32      | Set it on the ground.  |         |      |         |      |
| 33      | Release tracker.   |         |      |         |      |
| 34      | Move it forward until the electrical connectors break contact. |         |      |         |      |
| 35      | Apply downward pressure.                                       |         |      |         |      |
| 36      | Reseat tracker to round.                                       |         |      |         |      |
| 37      | Place round back on shoulder.                                  |         |      |         |      |
| 38      | Acquire previous target.                                       |         |      |         |      |
| 39      | Sound off "I am continuing with the mission."                  |         |      |         |      |
| 40      | Squeeze trigger lever bar.                                     |         |      |         |      |
|         | IF ROUND FAILS TO FIRE:  |         |      |         |      |
| 41      | Feel in vicinity of tracker battery.                           |         |      |         |      |
|         | STILL COLD:  |         |      |         |      |
| 42      | Remove tracker from round.                                     |         |      |         |      |
| 43      | Carry round safe distance from enemy.                          |         |      |         |      |
| 44      | Keep round pointed toward enemy.                               |         |      |         |      |
| 45      | Obtain another round.  |         |      |         |      |
| 46      | Mount tracker on round.  |         |      |         |      |
| 47      | Acquire previous or new target.                                |         |      |         |      |
| 48      | Sound off "I am continuing with the mission."                  |         |      |         |      |
| 49      | Squeeze trigger lever bar.                                     |         |      |         |      |
|         | IF SECOND ROUND FAILS TO FIRE:                                 |         |      |         |      |
| 50      | Feel in vicinity of tracker battery.                           |         |      |         |      |
|         | IF TRACKER BATTERY IS STILL COLD:                              |         |      |         |      |
| 51      | Tracker is probably defective.                                 |         |      |         |      |
| 52      | Remove tracker from round.                                     |         |      |         |      |
| 53      | Replace in carrying bag.                                       |         |      |         |      |
| 54      | Take to squad leader.  |         |      |         |      |
| 55      | Await further instructions.                                    |         |      |         |      |

| Content |  | Trial 1 |      | Trial 2 |      |
|---------|--|---------|------|---------|------|
|         |  | GO      | NOGO | GO      | NOGO |
| 56      | Critical points were stressed. ("MISFIRE is only stated two times.)                          |         |      |         |      |
| 57      | Did the instructor explain the importance of the immediate action procedure to the students? |         |      |         |      |
| 58      | Did the instructor define the term "MISFIRE?"  |         |      |         |      |
| 59      | Did the instructor explain the causes of MISFIRE?  |         |      |         |      |
| 60      | Did the instructor explain the causes of HANGFIRE?   |         |      |         |      |
| 61      | Did the instructor explain how to determine the cause of a MISFIRE?                          |         |      |         |      |
| 62      | Did the instructor identify the three major steps in the HOT condition hangfire procedure?   |         |      |         |      |
| 63      | Did the instructor identify the five major steps in the COLD condition misfire procedure?    |         |      |         |      |

## ASSESSMENT OF ABILITY TO DIAGNOSE AND CORRECT ERRORS: MALFUNCTIONS

### INSTRUCTOR OBJECTIVE

Diagnose and correct student errors to indicate what actions the student must take to perform malfunction procedures on the M47 medium antitank weapon system (Dragon) with day tracker.

### CONDITIONS

Given the scenarios on the following pages.

### STANDARDS

Suggested standard is to detect a total of 7 errors, and to have at least one appropriate method of correction for each. Two trials are allowed.

### TESTING PROCEDURE

The instructor is seated at a table, and is given a pencil and a copy of the test booklet.



## TEST PROCEDURE AND SCORE CARD

In the scenario described below, a poor student makes many errors. This performance is described in the 5 paragraphs below. Each paragraph contains at least one error. Find the errors, and describe how you would correct the student. To help you, some possible methods of correction are listed below. You may select more than one description from the list.

Possible methods of correction:

- A) Explain how it should be done.
- B) Demonstrate how it should be done.
- C) Explain the safety implications.
- D) Explain the technical reason.
- E) Have the student repeat the task.

Scenario 1. "The student squeezed and released the trigger quickly but the round did not fire. The student squeezed the released the trigger quickly a second time, but again the round did not fire."

Error:

|  |         |         |
|--|---------|---------|
| Failed to keep trigger depressed for 15 seconds. | GO/NOGO | GO/NOGO |
|--|---------|---------|

Methods of correction:

|                                   |         |         |
|-----------------------------------|---------|---------|
| A) Explain how it should be done. | GO/NOGO | GO/NOGO |
| D) Explain the technical reason.  | GO/NOGO | GO/NOGO |

Scenario 2. "The student sounded off MISFIRE, reached back over the right shoulder with the right hand, and felt the battery to see if it was hot."

Error:

|                                     |         |         |
|-------------------------------------|---------|---------|
| Student felt (touched) the battery. | GO/NOGO | GO/NOGO |
|-------------------------------------|---------|---------|

Methods of correction:

|                                       |         |         |
|---------------------------------------|---------|---------|
| B) Demonstrate how it should be done. | GO/NOGO | GO/NOGO |
| C) Explain the safety implications.   | GO/NOGO | GO/NOGO |

Scenario 3. "The battery was cold. Keeping the trigger depressed, the student removed the round from the shoulder and set it on the ground. The student released the tracker and correctly reseated it on the round. Placed the round back on shoulder and announced "Am re-engaging target."

Errors:

|  |         |         |
|--|---------|---------|
| Keeping the trigger depressed (should have released trigger after 15 seconds). | GO/NOGO | GO/NOGO |
| Said the wrong thing (should have been "I am continuing with the mission.").   | GO/NOGO | GO/NOGO |

Methods of correction:

|                                   |         |         |
|-----------------------------------|---------|---------|
| A) Explain how it should be done. | GO/NOGO | GO/NOGO |
| E) Have student repeat task.      | GO/NOGO | GO/NOGO |

Scenario 4. "The round failed to fire. The student released the trigger, and removed the round from his shoulder, and announced "Releasing trigger."

Errors:

|  |         |         |
|--|---------|---------|
| Failed to check battery                            | GO/NOGO | GO/NOGO |
| Said the wrong thing (should have said "MISFIRE.") | GO/NOGO | GO/NOGO |

Methods of correction:

|                                   |         |         |
|-----------------------------------|---------|---------|
| A) Explain how it should be done. | GO/NOGO | GO/NOGO |
| D) Explain the technical reason.  | GO/NOGO | GO/NOGO |
| E) Have student repeat task.      | GO/NOGO | GO/NOGO |

Scenario 5. "Released trigger and sounded off "MISFIRE." Cautiously feeling in the vicinity of the battery, the student found that it was cold. He placed the round on the ground, removed the tracker, and went to fetch a new round."

Errors:

|   |         |         |
|---|---------|---------|
| Should have reseated the round to the tracker and continued with the mission. | GO/NOGO | GO/NOGO |
| Didn't move the round to a safe distance away.                                | GO/NOGO | GO/NOGO |

Methods of correction:

|   |         |         |
|---|---------|---------|
| B) Explain the safety implications.   | GO/NOGO | GO/NOGO |
| D) Explain the technical reason for reseating the round on a cold battery before getting another round. | GO/NOGO | GO/NOGO |
| E) Have student repeat task.  | GO/NOGO | GO/NOGO |

## APPENDIX I

### INSTRUCTOR CERTIFICATION TRAINING MATERIALS: ENGAGE TARGETS WITH DRAGON TRAINING EQUIPMENT

# QUALIFY WITH THE DRAGON WEAPON SYSTEM TRAINING EQUIPMENT

## DRAGON INSTRUCTOR CERTIFICATION PROGRAM

### INSTRUCTOR MATERIAL

Training objective: Qualify with the Dragon weapon system training equipment (LET).

Conditions: On a tracking range, during daylight, given the LET, monitoring set, target set, day tracker, and M64 cartridge.

Standard: Achieve 16 of 20 possible hits from the sitting position and 16 of 20 hits from the standing supported position.

32-35 hits, student qualifies as first class gunner  
36-40 hits, student qualifies as expert gunner

### REQUIRED TRAINING AIDS

Dragon training equipment  
launch effects trainer (LET)  
monitoring set  
tracker  
80 M64 cartridges per student  
M89 target vehicle  
Instruction and qualification firing tables

### TRAINING TIPS

State purpose and standard of block of instruction.

This tells the student what must be done to complete the task successfully.

Define/clarify key points the student must remember to perform successfully.

Remind student to keep elbows tucked, eye in eyepiece and apply downward and backward pressure on the round. Failure to do these three actions will result in a "miss."

Explain the type of feedback student will receive as well as what it means.

#### Present rules

To engage a moving target, the gunner must lean in the direction of the moving target when initiating the track, engage the target when in a comfortable position, and follow through until end of track.

#### Provide practice

\* Some students will acquire this skill very quickly, while others will take a longer time to master it. Be patient. Take the time to ensure that those who need help receive it.

## Feedback

Meaningful feedback is the key to any successful performance. Provide immediate feedback during practice. Try to lessen the amount and frequency of the feedback as the student becomes more proficient with the skill. A good way to provide feedback to the student is to ask a question. For example, if the gunner did not have the eye in the eyepiece, ask if the eye was in the eyepiece properly. Make the gunner THINK about his performance.

\*\*\*\*\*

1. State the purpose of block of instruction.

To qualify with the Dragon weapon system training equipment (LET).

### Instructor's notes:

Explain to the students that the LET stands for Launch Effects Trainer. It simulates the effect of the weight shift which will occur when the Dragon is fired, as well as the slight delay between trigger pull and missile launch. By changing the simulated time of flight and the target vehicle speed, representations of distance are simulated. The one thing which is not accurate is that the vehicle size would change with changes in distance.

Make sure the students know they must receive 32 of 40 HITS.

2. Define/clarify key points.

Assume a stable firing position.

### For all positions:

Hold round tightly against the neck and shoulder.

Good contact between eye and eyepiece.

Elbows pointed down and in.

Right hand on trigger mechanism - thumb on safety and little finger forward of trigger mechanism.

Left hand on sight tube of tracker - in the shape of a "C."

Breath control.

### Standing supported:

Bipod out in front so gunner reaches for round.

Feet should be shoulder distant apart.

Lean against the foxhole.

Take slack out of bipod.

### Sitting:

Legs extended.

Feet against bipod.

Back straight (but leaning forward).

Explain team concept:

- Gunner duties
- Loader duties
- Rodder duties
- Fourth person duties

Explain the monitor set feedback:

- HIT/MISS
- Target range/off target setting
- Tracker indicator score meter

Instructor's notes: Remind the gunner that a "miss" will be scored if the eye is not firmly in the eyepiece, elbows are not tucked in and downward, and backward pressure is not applied to the round and tracker.

If a stable position is not assumed the gunner has a greater chance of grounding the missile immediately after launch or allowing the missile to get too far off course and not having enough rocket motors to get back on course.

3. Present rules - Start tracking the target before the missile is launched, launch the missile, continue tracking until impact (simulated impact).

Instructor's notes: Remind the gunner that point of aim is the center of mass of the target (IR board). With the Dragon, the gunner does not have to lead the target when it is moving.

4. Provide practice - Practice is the key gunner element of this skill. Practice does not make perfect. Perfect practice makes perfect.

Explain start with stationary targets and progression to moving. Start easy and move to more difficult firings.

Instructor's notes: Assure that the gunner does the same thing every time he assumes a firing position. Check the gunner's position.

5. Feedback - Feedback is the key instructor element of this skill. The instructor must provide meaningful feedback to the gunner. Feedback can be given at various times. Feedback can be given as the gunner assumes the firing position; it can be given during the track; and finally, it can be given upon completion of the firing.

Instructor's notes: There are several sources of feedback when the gunner is firing the LET.

The instructor can watch the gunner before firing, thus commenting on the gunner's firing position and actions.

During tracking, the instructor can observe the gunner or watch the tracker indicator score meter. The tracker indicator score meter reading may not

actually identify a significant gunner error (for example, eye not in eyepiece), so watch the gunner.

Following the track, the instructor can tell the gunner whether he has scored a "hit" or "miss," the tracker indicator score meter setting, and the target range/off target setting for misses. The tracker indicator score meter reading and target range/off target settings will be meaningless to the gunner unless the instructor explains the readings.

APPENDIX J

INSTRUCTOR CERTIFICATION TEST:  
ENGAGE TARGETS WITH DRAGON TRAINING EQUIPMENT



## INSTRUCTOR CERTIFICATION TEST FOR LET FIRING

### 1. ASSESSMENT OF ABILITY TO INSTRUCT

Instructor objective: Instruct students during instructional firing with the M47 medium antitank weapon training equipment.

Conditions: Given a complete and operational set of Dragon training equipment, day or night tracker, an M89 target vehicle, instructional firing tables, and audience.

Standards: Instruct student on firing the LET. The instructor must successfully present the information in two attempts. (Note: No LET firings are required.) Instruction must include the following parts:

Instructor: \_\_\_\_\_

Date: \_\_\_\_\_

|   | Trial 1    | Trial 2    |
|---|------------|------------|
| State purpose of block of instruction                         | GO / NO GO | GO / NO GO |
| Explanation of LET read-out:                                  |            |            |
| HIT/MISS  | GO / NO GO | GO / NO GO |
| Tracker indicator score                                       | GO / NO GO | GO / NO GO |
| Target Scenario:  |            |            |
| Target speeds   | GO / NO GO | GO / NO GO |
| Time of flight simulation                                     | GO / NO GO | GO / NO GO |
| Why stationary targets first                                  | GO / NO GO | GO / NO GO |
| Balance of left/right moving targets                          | GO / NO GO | GO / NO GO |
| Task:   |            |            |
| Cross hairs on center of mass (IR source)                     | GO / NO GO | GO / NO GO |
| Do not breathe  | GO / NO GO | GO / NO GO |
| Review standing supported firing position                     | GO / NO GO | GO / NO GO |
| Review sitting firing position                                | GO / NO GO | GO / NO GO |
| Delay after trigger pull before charge goes off               | GO / NO GO | GO / NO GO |
| Body position for moving target (lean in direction of target) | GO / NO GO | GO / NO GO |
| Team concept:   |            |            |
| Gunner  | GO / NO GO | GO / NO GO |
| Rod man   | GO / NO GO | GO / NO GO |
| LET loader (safety)   | GO / NO GO | GO / NO GO |
| All others below for safety                                   | GO / NO GO | GO / NO GO |

## 2. ASSESSMENT OF ABILITY TO IDENTIFY STUDENT ERRORS, ANALYZE REASON FOR ERRORS, AND CORRECT ERRORS

Instructor objective: To analyze, evaluate and correct student performance on the Dragon weapon system training equipment (LET).

Conditions: Given 5 of the 7 gunner performance scenarios, a score sheet, and pencil.

[For the future: Given a film of Dragon weapon system training equipment (LET) firings, a score sheet, and pencil.]

Standards: Identify and correct errors on 5 of 7 performances (Note: This may be written or oral).

Test problems (with answers):

1. Gunner has problems getting on target and staying on target during track.

Problem: Slack not out of bipod. GO / NO GO GO / NO GO

Correction: Place bipod feet further away from gunner. Gunner is forced to reach for round and tracker, and to pull down & back. GO / NO GO GO / NO GO

2. Gunner scores a "hit" on the LET monitor, however the instructor scores a "miss."

Problem: Eye away from eyepiece GO / NO GO GO / NO GO

Correction: Tell gunner to place eye firmly and securely in eyepiece. A "miss" will be scored if this occurs during qualification firing. GO / NO GO GO / NO GO

3. The tracker indicator score reading is steady at first, but becomes erratic (left/right and up/down) during track.

Problem: Gunner is breathing during track GO / NO GO GO / NO GO

Correction: Tell gunner to hold a steady position - downward and backward pressure, and not to breathe just before trigger pull or throughout entire track. GO / NO GO GO / NO GO

4. Gunner missed target. The target range/off target setting shows a downward miss at 1 to 2 seconds.

Problem: Gunner is being effected by weight shift and delay in charge

GO / NO GO GO / NO GO

Correction: Apply downward and backward pressure, keep elbows down and in, keep eye in eyepiece

GO / NO GO GO / NO GO

5. Gunner missed target. Target range/off target setting shows an up/down miss at 9 to 10 seconds.

Problem: Gunner did not hold breath for entire track.

GO / NO GO GO / NO GO

Correction: Gunner needs to be told to hold breath. Gunner may need to practice holding breath for 10 to 15 seconds.

GO / NO GO GO / NO GO

6. Gunner ends track in a twisted, awkward position, often missing the target on the last few seconds of the track.

Problem: Gunner has not prepared himself properly for the track.

GO / NO GO GO / NO GO

Correction: Place the bipod legs in a position which will allow the gunner to rotate to a comfortable position during tracking. Gunner leans in direction of vehicle travel and rotates torso when tracking. Practice these movements and position before the next track.

GO / NO GO GO / NO GO

7. Gunner complains he cannot see the target.

Problem: The bipod setting may be too high or low for the gunner. The focus adjust may not be properly set for this gunner. The eye may not be placed properly in the eyepiece.

GO / NO GO GO / NO GO

Correction: Adjust bipod to proper setting for this gunner. Have gunner adjust focus prior to firing. Check eye placement in eyepiece.

GO / NO GO GO / NO GO

## SCORE SHEET

### 1. Assessment of ability to instruct

Instructor objective: Instruct students during instructional firing with the M47 medium antitank weapon training equipment.

Conditions: Given a complete and operational set of Dragon training equipment, day or night tracker, an M89 target vehicle, instructional firing tables, and audience.

Standards: Instruct student on firing the LET. The instructor must successfully present the information in two attempts. (Note: No LET firings are required.) Instruction must include the following parts:

Instructor: \_\_\_\_\_

Date: \_\_\_\_\_

|   | Trial 1    | Trial 2    |
|---|------------|------------|
| State purpose of block of instruction                         | GO / NO GO | GO / NO GO |
| Explanation of LET read-out:                                  |            |            |
| HIT/MISS  | GO / NO GO | GO / NO GO |
| Tracker indicator score                                       | GO / NO GO | GO / NO GO |
| Target Scenario:  |            |            |
| Target speeds   | GO / NO GO | GO / NO GO |
| Time of flight simulation                                     | GO / NO GO | GO / NO GO |
| Why stationary targets first                                  | GO / NO GO | GO / NO GO |
| Balance of left/right moving targets                          | GO / NO GO | GO / NO GO |
| Task:   |            |            |
| Cross hairs on center of mass (IR source)                     | GO / NO GO | GO / NO GO |
| Do not breathe  | GO / NO GO | GO / NO GO |
| Review standing supported firing position                     | GO / NO GO | GO / NO GO |
| Review sitting firing position                                | GO / NO GO | GO / NO GO |
| Delay after trigger pull before charge goes off               | GO / NO GO | GO / NO GO |
| Body position for moving target (lean in direction of target) | GO / NO GO | GO / NO GO |
| Team concept:   |            |            |
| Gunner  | GO / NO GO | GO / NO GO |
| Rod man   | GO / NO GO | GO / NO GO |
| LET loader (safety)   | GO / NO GO | GO / NO GO |
| All others below for safety                                   | GO / NO GO | GO / NO GO |

SCORE

Pass / Fail

Pass / Fail

## 2. LET error assessment

### Test problems:

1. Gunner has problems getting on target and staying on target during track.

|             |            |            |
|-------------|------------|------------|
| Problem:    | GO / NO GO | GO / NO GO |
| Correction: | GO / NO GO | GO / NO GO |

2. Gunner scores a "hit" on the LET monitor, however the instructor scores a "miss."

|             |            |            |
|-------------|------------|------------|
| Problem:    | GO / NO GO | GO / NO GO |
| Correction: | GO / NO GO | GO / NO GO |

3. The tracker indicator score reading is steady at first, but becomes erratic (left/right and up/down) during track.

|             |            |            |
|-------------|------------|------------|
| Problem:    | GO / NO GO | GO / NO GO |
| Correction: | GO / NO GO | GO / NO GO |

4. Gunner missed target. The target range/off target setting shows a downward miss at 1 to 2 seconds.

|             |            |            |
|-------------|------------|------------|
| Problem:    | GO / NO GO | GO / NO GO |
| Correction: | GO / NO GO | GO / NO GO |

5. Gunner missed target. Target range/off target setting shows an up/down miss at 9 to 10 seconds.

|             |            |            |
|-------------|------------|------------|
| Problem:    | GO / NO GO | GO / NO GO |
| Correction: | GO / NO GO | GO / NO GO |

6. Gunner ends track in a twisted, awkward position, often missing the target on the last few seconds of the track.

|             |            |            |
|-------------|------------|------------|
| Problem:    | GO / NO GO | GO / NO GO |
| Correction: | GO / NO GO | GO / NO GO |

7. Gunner complains he cannot see the target.

|             |            |            |
|-------------|------------|------------|
| Problem:    | GO / NO GO | GO / NO GO |
| Correction: | GO / NO GO | GO / NO GO |

SCORE

Pass / Fail      Pass / Fail

**APPENDIX K**

**INSTRUCTOR OBSERVATION FORM:  
PREPARE DRAGON FOR FIRING**

Instructor: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

# PREPARE THE M47 MEDIUM ANTITANK WEAPON SYSTEM FOR FIRING

Time instruction started: \_\_\_\_\_ Time instruction ended: \_\_\_\_\_  
Time practice started: \_\_\_\_\_ Time practice ended: \_\_\_\_\_

| Taught |   | Content   | Student Summary<br>(test) |   |   |      |   |   |
|--------|---|---|---------------------------|---|---|------|---|---|
|        |   |   | GO                        |   |   | NOGO |   |   |
|        |   |   | 1                         | 2 | 3 | 1    | 2 | 3 |
| Y      | N | ?   |                           |   |   |      |   |   |
|        |   |   |                           |   |   |      |   |   |
|        |   | ROUND:  |                           |   |   |      |   |   |
| 1      |   | Unsnap bipod retaining strap.   |                           |   |   |      |   |   |
| 2      |   | Push bipod forward until resistance is met, then<br>slap off the forward shock absorber.            |                           |   |   |      |   |   |
| 3      |   | With the FHT, ensure bipod brace is locked.   |                           |   |   |      |   |   |
| 4      |   | While holding round, push bipod legs downward<br>to number 4 or 5. Release friction lock.           |                           |   |   |      |   |   |
| 5      |   | Assume firing position (sit, stand, kneel, prone).  |                           |   |   |      |   |   |
|        |   | DAY TRACKER:  |                           |   |   |      |   |   |
| 6      |   | Pull carrying bag flap open.  |                           |   |   |      |   |   |
| 7      |   | Hold open with right hand.  |                           |   |   |      |   |   |
| 8      |   | Grasp tracker by optical tube (telescope barrel)<br>or trigger mechanism, and remove from bag.      |                           |   |   |      |   |   |
| 9      |   | Do not lift tracker by shock absorbers.   |                           |   |   |      |   |   |
| 10     |   | Do not touch lens.  |                           |   |   |      |   |   |
| 11     |   | Remove electrical connector cover from electrical<br>connector.                                     |                           |   |   |      |   |   |
| 12     |   | Secure cover on velcro.   |                           |   |   |      |   |   |
|        |   | MATE:   |                           |   |   |      |   |   |
| 13     |   | Place guide pins in slots of tracker bracket guide<br>rail.   |                           |   |   |      |   |   |
| 14     |   | Push tracker firmly to the rear using both hands<br>until spring clip locks the guide pin in place. |                           |   |   |      |   |   |
| 15     |   | Shake tracker to ensure it is locked in place.  |                           |   |   |      |   |   |
| 16     |   | Remove lens cover.  |                           |   |   |      |   |   |
| 17     |   | Secure to top of forward shock absorber.  |                           |   |   |      |   |   |
| 18     |   | Visually inspect the lens for damage or obstruction.  |                           |   |   |      |   |   |

| Taught |   |   | Content  |  |  | GO |   |   | NOGO |   |   |
|--------|---|---|--|--|--|----|---|---|------|---|---|
| Y      | N | ? |  |  |  | 1  | 2 | 3 | 1    | 2 | 3 |
| 19     |   |   | Do not press safety and trigger while mating.        |  |  |    |   |   |      |   |   |
| 20     |   |   | Adjust for height and level sight picture.           |  |  |    |   |   |      |   |   |
| 21     |   |   | Look to see if there is a level sight picture.       |  |  |    |   |   |      |   |   |
| 22     |   |   | Adjust bipod friction lock.                          |  |  |    |   |   |      |   |   |
| 23     |   |   | Adjust foot adjust to obtain a level sight picture.  |  |  |    |   |   |      |   |   |
| 24     |   |   | The friction lock and foot adjust must be performed. |  |  |    |   |   |      |   |   |

25 List other material taught, but not listed above.



#### Definition of Terms

- 26 Y/N Telescope barrel
- 27 Y/N Optical tube
  
- 28 Y/N The students were given the reason why they had to adjust the bipod lock and friction lock.
- 29 Y/N Students were told they must inspect both sides of the guide pin/tracker bracket alignment before mating the tracker and round.
- 30 Y/N Students were told they must say, "I am removing the electrical connector cover from the round."
- 31 Y/N Students were told they must say, "I have obtained a level sight picture."
- 32 Y/N Students were told they must say, "I am visually inspecting the lens."
  
- 33 Y/N Students were told training objective.
- 34 Y/N Students were told there was a 30 second time standard.
  
- 35 Y/N Instructor used student handout as a training aid.
- 36 Y/N Instructor used other training aids (handouts, sketches).  
List:
  
- 37 Y/N Instructor called on each student during practice to identify parts/components.
- 38 Y/N Instructor used the same terms throughout instruction.
- 39 Y/N Instructor emphasize sequence.
- 40 Y/N Instructor immediately corrected errors during practice.
- 41 Y/N Instructor gave initial demonstration of task.
- 42 Y/N Instructor talked student through initial demonstration of task.
- 43 Y/N Memory cues were used (Number 4 or 5 on bipod leg setting is parallel to ground). List:
  
- 44 Y/N Instructor asked if student had questions.
- 45 Y/N There were student questions.  
List:
  
- 46 Y/N Critical points were stressed (Remove imaginary connector).  
If so, what?

APPENDIX L

STUDENT OBSERVATION FORM:  
PREPARE DRAGON FOR FIRING

Student: \_\_\_\_\_ Observer: \_\_\_\_\_ Date \_\_\_\_\_

# PREPARE THE M47 MEDIUM ANTITANK WEAPON SYSTEM FOR FIRING

Time practice/test started: \_\_\_\_\_ Time practice/test ended: \_\_\_\_\_  
 Number of practice/test trials: \_\_\_\_\_ Trial received GO: 1 2 3 \_\_\_\_\_

| Content |  | GO |   |   | NOGO |   |   |
|---------|--|----|---|---|------|---|---|
|         |  | 1  | 2 | 3 | 1    | 2 | 3 |
|         | ROUND:   |    |   |   |      |   |   |
| 1       | Unsnap bipod retaining strap.  |    |   |   |      |   |   |
| 2       | Push bipod forward until resistance is met, then slap off the forward shock absorber.            |    |   |   |      |   |   |
| 3       | With the FHT, ensure bipod brace is locked.  |    |   |   |      |   |   |
| 4       | While holding round, push bipod legs downward to number 4 or 5.                                  |    |   |   |      |   |   |
| 5       | Release friction lock.   |    |   |   |      |   |   |
| 6       | "I am removing the electrical connector cover from the round."                                   |    |   |   |      |   |   |
| 7       | Select firing position (sit, stand, kneel, prone).   |    |   |   |      |   |   |
| 8       | DAY TRACKER:   |    |   |   |      |   |   |
| 8       | Pull carrying bag flap open.   |    |   |   |      |   |   |
| 9       | Hold open with right hand.   |    |   |   |      |   |   |
| 10      | Grasp tracker by optical tube (telescope barrel) or trigger mechanism, and remove from bag.      |    |   |   |      |   |   |
| 11      | Do not lift tracker by shock absorbers.  |    |   |   |      |   |   |
| 12      | Do not touch lens.   |    |   |   |      |   |   |
| 13      | "I am visually inspecting the lens."   |    |   |   |      |   |   |
| 14      | Remove electrical connector cover from electrical connector and secure cover on velcro.          |    |   |   |      |   |   |
| 15      | MATE:  |    |   |   |      |   |   |
| 15      | Place guide pins in slots of tracker bracket guide rail.   |    |   |   |      |   |   |
| 16      | Push tracker firmly to the rear using both hands until spring clip locks the guide pin in place. |    |   |   |      |   |   |
| 17      | Shake tracker to ensure it is locked in place.   |    |   |   |      |   |   |
| 18      | Remove lens cover and secure to top of forward shock absorber.                                   |    |   |   |      |   |   |

| Content |   | GO |   |   | NOGO |   |   |
|---------|---|----|---|---|------|---|---|
|         |   | 1  | 2 | 3 | 1    | 2 | 3 |
| 19      | Visually inspect the lens for damage or obstruction.                        |    |   |   |      |   |   |
| 20      | Did not press safety and trigger while mating.                              |    |   |   |      |   |   |
| 21      | Adjust for height and level sight picture.                                  |    |   |   |      |   |   |
| 22      | Look to see if there is a level sight picture.                              |    |   |   |      |   |   |
| 22      | Adjust bipod friction lock and foot adjust to obtain a level sight picture. |    |   |   |      |   |   |
| 24      | "I have obtained a level sight picture."                                    |    |   |   |      |   |   |

TEST ONLY:

25 Y/N Instructor asked leading questions to help the student pass the test.

26 Y/N Would you have passed this student?

27 Y/N Instructor stopped student when a mistake was made.

28 Y/N Instructor told student he made a mistake, but student was allowed to continue with the task.

29 Y/N Other occurrences (unusual weather, unexpected instructor assignments)?

## APPENDIX M

### INSTRUCTOR OBSERVATION FORM: DETERMINE TARGET ENGAGEABILITY

Instructor: \_\_\_\_\_ Observer: \_\_\_\_\_ Date \_\_\_\_\_

# DETERMINE TARGET ENGAGEABILITY WITH THE M47 MEDIUM ANTITANK WEAPON SYSTEM

Time instruction started: \_\_\_\_\_ Time instruction ended: \_\_\_\_\_  
Time practice started: \_\_\_\_\_ Time practice ended: \_\_\_\_\_

| Taught |   | Content   | Student Summary<br>(test) |   |   |      |   |   |
|--------|---|---|---------------------------|---|---|------|---|---|
|        |   |   | GO                        |   |   | NOGO |   |   |
| Y      | N | ?   | 1                         | 2 | 3 | 1    | 2 | 3 |
|        |   |   |                           |   |   |      |   |   |
| 1      |   |   |                           |   |   |      |   |   |
|        |   | FLANKING:   |                           |   |   |      |   |   |
|        |   | Adjust sight picture by moving launcher to center the target between the stadia lines.                                |                           |   |   |      |   |   |
| 2      |   |   |                           |   |   |      |   |   |
|        |   | Meet or exceed the lines then in range.   |                           |   |   |      |   |   |
| 3      |   |   |                           |   |   |      |   |   |
|        |   | Within the lines then out of range.   |                           |   |   |      |   |   |
|        |   | FRONTAL OR REAR:  |                           |   |   |      |   |   |
|        |   | Adjust the sight picture by moving the launcher to align the vertical crosshair and one stadia line on the target.    |                           |   |   |      |   |   |
| 4      |   |   |                           |   |   |      |   |   |
|        |   | Meet or exceed the lines then in range.   |                           |   |   |      |   |   |
| 5      |   |   |                           |   |   |      |   |   |
|        |   | Within the lines then out of range.   |                           |   |   |      |   |   |
| 6      |   |   |                           |   |   |      |   |   |
|        |   | OBLIQUE:  |                           |   |   |      |   |   |
|        |   | If more flank is visible, then use full stadia method.  |                           |   |   |      |   |   |
| 7      |   |   |                           |   |   |      |   |   |
|        |   | If more front is visible, then use half stadia method.  |                           |   |   |      |   |   |
| 8      |   |   |                           |   |   |      |   |   |
|        |   | ENGAGEABILITY:  |                           |   |   |      |   |   |
|        |   | Place edge of sight picture on front of target and inspect anticipated path of the vehicle to opposite edge of sight. |                           |   |   |      |   |   |
| 9      |   |   |                           |   |   |      |   |   |
|        |   | If there is covered area, there is not enough time to fire and hit the target.  |                           |   |   |      |   |   |
| 10     |   |   |                           |   |   |      |   |   |
|        |   | If there is no covered area, there is enough time to fire and hit.  |                           |   |   |      |   |   |
| 11     |   |   |                           |   |   |      |   |   |

12 List other material taught, but not listed above.

### Definition of Terms

- 13 Y/N Stadia lines
- 14 Y/N Cross hairs
- 15 Y/N Full stadia method
- 16 Y/N Half stadia method
- 17 Y/N Flank target
- 18 Y/N Frontal target
- 19 Y/N Rear or "going away" target
- 20 Y/N Flanking oblique
- 21 Y/N Frontal oblique
  
- 22 Y/N Instructor explained relationship between speed of vehicle, distance travelled and view in optics.
- 23 Y/N Instructor showed incorrect placements of sight picture when teaching engageability.
- 24 Y/N Instructor used different examples when calling upon different students.
  
- 25 Y/N Instructor called on each student during instruction.
- 26 Y/N Instructor gave initial demonstration/explanation of task.
- 27 Y/N Instructor used the same terms throughout instruction.
- 28 Y/N Instructor emphasized sequence.
- 29 Y/N Instructor immediately corrected errors during practice.
- 30 Y/N Instructor talked student through initial demonstration/explanation of task.
- 31 Y/N Instructor had students evaluate each other.
  
- 32 Y/N Instructor showed reticle for the day tracker.
- 33 Y/N Instructor showed reticle for the night tracker.
- 34 Y/N Instructor used student handout as training aid.
- 35 Y/N Instructor used other training aids (sketches, models, minivillage).  
List:
  
- 36 Y/N Instructor asked if students had any questions.
- 37 Y/N There were student questions.  
List:
  
- 38 Y/N Memory cues were used.  
List:
  
- 39 Y/N Critical points were stressed.  
If so, what? (If a target is out of range, it is not engageable.)

APPENDIX N

STUDENT OBSERVATION FORM:  
DETERMINE TARGET ENGAGEABILITY



Student: \_\_\_\_\_ Observer: \_\_\_\_\_ Date \_\_\_\_\_

# **DETERMINE TARGET ENGAGEABILITY WITH THE M47 MEDIUM ANTITANK WEAPON SYSTEM**

Time practice/test started: \_\_\_\_\_ Time practice/test ended: \_\_\_\_\_  
 Number of practice/test trials: \_\_\_\_\_ Trial received GO: 1 2 3  
 Summary of practice/test results: \_\_\_\_\_

|                 |            | Student Performance |         |         |
|-----------------|------------|---------------------|---------|---------|
|                 |            | Trial 1             | Trial 2 | Trial 3 |
| a. Flank        | In/Out     | GO/NOGO             | GO/NOGO | GO/NOGO |
|                 | Eng/Noneng | GO/NOGO             | GO/NOGO | GO/NOGO |
| b. Frontal      | In/Out     | GO/NOGO             | GO/NOGO | GO/NOGO |
|                 | Eng/Noneng | GO/NOGO             | GO/NOGO | GO/NOGO |
| c. Oblique/Flk  | In/Out     | GO/NOGO             | GO/NOGO | GO/NOGO |
|                 | Eng/Noneng | GO/NOGO             | GO/NOGO | GO/NOGO |
| d. Oblique/Frnt | In/Out     | GO/NOGO             | GO/NOGO | GO/NOGO |
|                 | Eng/Noneng | GO/NOGO             | GO/NOGO | GO/NOGO |
| e. _____        | In/Out     | GO/NOGO             | GO/NOGO | GO/NOGO |
|                 | Eng/Noneng | GO/NOGO             | GO/NOGO | GO/NOGO |
| f. _____        | In/Out     | GO/NOGO             | GO/NOGO | GO/NOGO |
|                 | Eng/Noneng | GO/NOGO             | GO/NOGO | GO/NOGO |

| Content |   | GO |   |   | NOGO |   |   |
|---------|---|----|---|---|------|---|---|
|         |   | 1  | 2 | 3 | 1    | 2 | 3 |
| 1       | <b>FLANKING:</b><br>Adjust sight picture by moving launcher to center the target between the stadia lines.                                    |    |   |   |      |   |   |
| 2       | Meet or exceed the lines then in range.   |    |   |   |      |   |   |
| 3       | Within the lines then out of range.   |    |   |   |      |   |   |
| 4       | <b>FRONTAL OR REAR:</b><br>Adjust the sight picture by moving the launcher to align the vertical crosshair and one stadia line on the target. |    |   |   |      |   |   |
| 5       | Meet or exceed the lines then in range.   |    |   |   |      |   |   |
| 6       | Within the lines then out of range.   |    |   |   |      |   |   |
| 7       | <b>OBLIQUE:</b><br>If more flank is visible, then use full stadia method.   |    |   |   |      |   |   |
| 8       | If more front is visible, then use half stadia method.  |    |   |   |      |   |   |

|    | Content   | GO |   |   | NOGO |   |   |
|----|---|----|---|---|------|---|---|
|    |   | 1  | 2 | 3 | 1    | 2 | 3 |
| 9  | ENGAGEABILITY:<br>Place edge of sight picture on front of target and inspect anticipated path of the vehicle to opposite edge of sight. |    |   |   |      |   |   |
| 10 | If there is covered area, there is not enough time to fire and hit the target.  |    |   |   |      |   |   |
| 11 | If there is no covered area, there is enough time to fire and hit.  |    |   |   |      |   |   |

# TEST ONLY:

- 12 Y/N Instructor asked leading questions to help the student pass the test.
- 13 Y/N Would you have passed this student?
- 14 Y/N Instructor stopped student when a mistake was made.
- 15 Y/N Instructor told student he made a mistake, but student was allowed to continue with the task.
- 16 Y/N Other occurrences (unusual weather, unexpected instructor replacements)?

APPENDIX O

INSTRUCTOR OBSERVATION FORM:  
PREPARE ANTIARMOR RANGE CARD

Instructor: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

### PREPARE AN ANTIARMOR RANGE CARD

Time instruction started: \_\_\_\_\_ Time instruction ended: \_\_\_\_\_  
 Time practice started: \_\_\_\_\_ Time practice ended: \_\_\_\_\_

|        |   | Student Summary<br>(test) |   |   |      |   |   |
|--------|---|---------------------------|---|---|------|---|---|
| Taught |   | GO                        |   |   | NOGO |   |   |
| Y      | N | 1                         | 2 | 3 | 1    | 2 | 3 |
|        |   |                           |   |   |      |   |   |
| 1      |   |                           |   |   |      |   |   |
| 2      |   |                           |   |   |      |   |   |
| 3      |   |                           |   |   |      |   |   |
| 4      |   |                           |   |   |      |   |   |
| 5      |   |                           |   |   |      |   |   |
| 6      |   |                           |   |   |      |   |   |
| 7      |   |                           |   |   |      |   |   |
| 8      |   |                           |   |   |      |   |   |
| 9      |   |                           |   |   |      |   |   |
| 10     |   |                           |   |   |      |   |   |
| 11     |   |                           |   |   |      |   |   |
| 12     |   |                           |   |   |      |   |   |
| 13     |   |                           |   |   |      |   |   |
| 14     |   |                           |   |   |      |   |   |
| 15     |   |                           |   |   |      |   |   |
| 16     |   |                           |   |   |      |   |   |
| 17     |   |                           |   |   |      |   |   |
| 18     |   |                           |   |   |      |   |   |
| 19     |   |                           |   |   |      |   |   |
| 20     |   |                           |   |   |      |   |   |
| 21     |   |                           |   |   |      |   |   |
| 22     |   |                           |   |   |      |   |   |
| 23     |   |                           |   |   |      |   |   |
| 24     |   |                           |   |   |      |   |   |

Definition of terms:

- 26 Y/N Back azimuth
- 27 Y/N Right limit
- 28 Y/N Left limit
- 29 Y/N ATEA
- 30 Y/N GRP
- 31 Y/N TRP
- 32 Y/N Sector of fire
- 33 Y/N Maximum engagement line
- 34 Y/N Dead space

Explanation of calculations:

- 35 Y/N Back azimuth
- 36 Y/N Meters between circles
  
- 37 Y/N Time limit (15 min) strictly enforced during practice.
- 38 Y/N Time limit (15 min) strictly enforced during testing.
- 39 Y/N A specific order for completing the range card was specified.
  
- 40 Y/N Students used a compass.
- 41 Y/N A compass was necessary to complete the task.
  
- 42 Y/N The practice problem was the same as the class example.
- 43 Y/N The test problem was the same as either the class example or the practice.
- 44 Y/N The 10 parts of a range card were clearly identified.
- 45 Y/N The practice range cards were graded and returned to the students prior to the test.
  
- 46 Y/N Instructor used the student handout as a training aid.
- 47 Y/N Instructor used other training aids (handouts, minivillage).  
List:
  
- 48 Y/N Key points were stressed.  
If so, what?
  
- 49 Y/N Memory cues were used (Dragon symbol is stick man carrying an umbrella).  
List:
  
- 50 Y/N Instructor asked if students had any questions.
- 51 Y/N There were student questions.  
List:

- 52 Y/N Instructor called on each student during practice.
- 53 Y/N Instructor used the same terms throughout instruction.
- 54 Y/N Instructor emphasized sequence.
- 55 Y/N Instructor immediately corrected errors during practice.
- 56 Y/N Instructor gave initial demonstration of task.
- 57 Y/N Instructor talked student through initial demonstration of task.

APPENDIX P

STUDENT OBSERVATION FORM:  
PREPARE ANTIARMOR RANGE CARD

Student: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

### PREPARE AN ANTIARMOR RANGE CARD

Time practice/test started: \_\_\_\_\_  
 Number of practice/test trials: \_\_\_\_\_

Time practice/test ended: \_\_\_\_\_  
 Trial received GO: 1 2 3

|    | Content  | GO |   |   | NOGO |   |   |
|----|--|----|---|---|------|---|---|
|    |  | 1  | 2 | 3 | 1    | 2 | 3 |
| 1  | Draw sector sketch.                                    |    |   |   |      |   |   |
| 2  | Dragon weapon symbol.                                  |    |   |   |      |   |   |
| 3  | Location of firing position (GRP).                     |    |   |   |      |   |   |
| 4  | Straight line with arrows pointing to gunner position. |    |   |   |      |   |   |
| 5  | Distance and azimuth from prominent terrain.           |    |   |   |      |   |   |
| 6  | Left limit drawn from weapon position.                 |    |   |   |      |   |   |
| 7  | Right limit drawn from weapon position.                |    |   |   |      |   |   |
| 8  | Anticipated target engagement area (ATEA) with number. |    |   |   |      |   |   |
| 9  | Target reference point (TRP) with number.              |    |   |   |      |   |   |
| 10 | Dead space.  |    |   |   |      |   |   |
| 11 | Maximum engagement line.                               |    |   |   |      |   |   |
| 12 | Maximum engagement line (label).                       |    |   |   |      |   |   |
|    | Marginal information.                                  |    |   |   |      |   |   |
| 13 | Magnetic north symbol.                                 |    |   |   |      |   |   |
| 14 | Unit designation.                                      |    |   |   |      |   |   |
|    | Data section.  |    |   |   |      |   |   |
| 15 | Position identification (primary).                     |    |   |   |      |   |   |
| 16 | Dragon symbol.   |    |   |   |      |   |   |
| 17 | Date.  |    |   |   |      |   |   |
| 18 | Meter between circles.                                 |    |   |   |      |   |   |
| 19 | Numbered ATEA.   |    |   |   |      |   |   |
| 20 | Numbered TRP.  |    |   |   |      |   |   |
| 21 | Direction.   |    |   |   |      |   |   |
| 22 | Distance (range).                                      |    |   |   |      |   |   |
| 23 | Description of object (road, bridge, etc.).            |    |   |   |      |   |   |
| 24 | Remarks.   |    |   |   |      |   |   |



TEST ONLY:

- 25 Y/N Instructor asked leading questions to help the student pass the test.
- 26 Y/N Would you have passed this student?
- 27 Y/N Instructor stopped student when a mistake was made.
- 28 Y/N Instructor told student he made a mistake, but student was allowed to continue with the task.
- 29 Y/N Other occurrences (unusual weather, unexpected instructor replacements)?

APPENDIX Q

INSTRUCTOR OBSERVATION FORM:  
PERFORM MALFUNCTION PROCEDURES

Instructor: \_\_\_\_\_

Observer: \_\_\_\_\_

Date: \_\_\_\_\_

# PERFORM MALFUNCTION PROCEDURES ON AN M47 DRAGON MEDIUM ANTITANK WEAPON

Time instruction started: \_\_\_\_\_

Time instruction ended: \_\_\_\_\_

Time practice started: \_\_\_\_\_

Time practice ended: \_\_\_\_\_

## Student Summary (test)

| Taught |   |   |  | Content  | GO |   |   | NOGO |   |   |
|--------|---|---|--|--|----|---|---|------|---|---|
| Y      | N | ? |  |  | 1  | 2 | 3 | 1    | 2 | 3 |
| 1      |   |   |  | Dragon fails to fire   |    |   |   |      |   |   |
|        |   |   |  | <b>HOT BATTERY:</b>  |    |   |   |      |   |   |
| 2      |   |   |  | Resqueeze the trigger.                                       |    |   |   |      |   |   |
| 3      |   |   |  | Continue to track for 15 sec.                                |    |   |   |      |   |   |
| 4      |   |   |  | Trigger must be depressed for the 15 sec.                    |    |   |   |      |   |   |
| 5      |   |   |  | Gunner told not to touch the battery.                        |    |   |   |      |   |   |
|        |   |   |  | <b>IF THE ROUND STILL DOES NOT FIRE:</b>                     |    |   |   |      |   |   |
| 6      |   |   |  | Release trigger.   |    |   |   |      |   |   |
| 7      |   |   |  | Sound off "MISFIRE."   |    |   |   |      |   |   |
| 8      |   |   |  | Support round on shoulder with left hand under round.        |    |   |   |      |   |   |
| 9      |   |   |  | Turn head to see tracker battery.                            |    |   |   |      |   |   |
| 10     |   |   |  | With right hand, feel in the vicinity of tracker battery.    |    |   |   |      |   |   |
|        |   |   |  |  |    |   |   |      |   |   |
| 11     |   |   |  | Remove round from shoulder.                                  |    |   |   |      |   |   |
| 12     |   |   |  | Gently set it on the ground.                                 |    |   |   |      |   |   |
|        |   |   |  |  |    |   |   |      |   |   |
| 13     |   |   |  | Remove tracker from round.                                   |    |   |   |      |   |   |
|        |   |   |  |  |    |   |   |      |   |   |
| 14     |   |   |  | Place round on ground, a safe distance from firing position. |    |   |   |      |   |   |
| 15     |   |   |  | Keep round pointed toward enemy.                             |    |   |   |      |   |   |
|        |   |   |  |  |    |   |   |      |   |   |
| 16     |   |   |  | Obtain other round.  |    |   |   |      |   |   |
| 17     |   |   |  | Mount tracker on new round.                                  |    |   |   |      |   |   |
| 18     |   |   |  | Acquire previous or new target.                              |    |   |   |      |   |   |
| 19     |   |   |  | Sound off "I am continuing with the mission."                |    |   |   |      |   |   |
| 20     |   |   |  | Squeeze trigger lever bar.                                   |    |   |   |      |   |   |
| 21     |   |   |  | Dragon fails to fire.  |    |   |   |      |   |   |
|        |   |   |  | <b>COLD BATTERY</b>  |    |   |   |      |   |   |
| 22     |   |   |  | Immediately resqueeze trigger.                               |    |   |   |      |   |   |
| 23     |   |   |  | Continue tracking for 15 sec.                                |    |   |   |      |   |   |
| 24     |   |   |  | Trigger is depressed throughout 15 sec.                      |    |   |   |      |   |   |
| 25     |   |   |  | Do not touch the battery.                                    |    |   |   |      |   |   |

| Taught |   |   | Content  |  |  | GO |   |   | NOGO |   |   |
|--------|---|---|--|--|--|----|---|---|------|---|---|
| Y      | N | ? |  |  |  | 1  | 2 | 3 | 1    | 2 | 3 |
|        |   |   | IF ROUND STILL DOES NOT FIRE:                                  |  |  |    |   |   |      |   |   |
| 26     |   |   | Release trigger.   |  |  |    |   |   |      |   |   |
| 27     |   |   | Sound off "MISFIRE".   |  |  |    |   |   |      |   |   |
| 28     |   |   | Support round with left hand.                                  |  |  |    |   |   |      |   |   |
| 29     |   |   | Turn head to see tracker battery.                              |  |  |    |   |   |      |   |   |
| 30     |   |   | Cautiously feel in vicinity of battery.                        |  |  |    |   |   |      |   |   |
| 31     |   |   | Remove round from shoulder.                                    |  |  |    |   |   |      |   |   |
| 32     |   |   | Set it on the ground.  |  |  |    |   |   |      |   |   |
| 33     |   |   | Release tracker.   |  |  |    |   |   |      |   |   |
| 34     |   |   | Move it forward until the electrical connectors break contact. |  |  |    |   |   |      |   |   |
| 35     |   |   | Apply downward pressure.                                       |  |  |    |   |   |      |   |   |
| 36     |   |   | Reseat tracker to round.                                       |  |  |    |   |   |      |   |   |
| 37     |   |   | Place round back on shoulder.                                  |  |  |    |   |   |      |   |   |
| 38     |   |   | Acquire previous target.                                       |  |  |    |   |   |      |   |   |
| 39     |   |   | Sound off "I am continuing with the mission."                  |  |  |    |   |   |      |   |   |
| 40     |   |   | Squeeze trigger lever bar.                                     |  |  |    |   |   |      |   |   |
| 41     |   |   | IF ROUND FAILS TO FIRE:  |  |  |    |   |   |      |   |   |
|        |   |   | Feel in vicinity of tracker battery.                           |  |  |    |   |   |      |   |   |
| 42     |   |   | STILL COLD:  |  |  |    |   |   |      |   |   |
|        |   |   | Remove tracker from round.                                     |  |  |    |   |   |      |   |   |
| 43     |   |   | Carry round safe distance from enemy.                          |  |  |    |   |   |      |   |   |
| 44     |   |   | Keep round pointed toward enemy.                               |  |  |    |   |   |      |   |   |
| 45     |   |   | Obtain another round.  |  |  |    |   |   |      |   |   |
| 46     |   |   | Mount tracker on round.  |  |  |    |   |   |      |   |   |
| 47     |   |   | Acquire previous or new target.                                |  |  |    |   |   |      |   |   |
| 48     |   |   | Sound off "I am continuing with the mission."                  |  |  |    |   |   |      |   |   |
| 49     |   |   | Squeeze trigger lever bar.                                     |  |  |    |   |   |      |   |   |
| 50     |   |   | IF SECOND ROUND FAILS TO FIRE:                                 |  |  |    |   |   |      |   |   |
|        |   |   | Feel in vicinity of tracker battery.                           |  |  |    |   |   |      |   |   |
| 51     |   |   | IF TRACKER BATTERY IS STILL COLD:                              |  |  |    |   |   |      |   |   |
|        |   |   | Tracker is probably defective.                                 |  |  |    |   |   |      |   |   |
| 52     |   |   | Remove tracker from round.                                     |  |  |    |   |   |      |   |   |
| 53     |   |   | Replace in carrying bag.                                       |  |  |    |   |   |      |   |   |
| 54     |   |   | Take to squad leader.  |  |  |    |   |   |      |   |   |
| 55     |   |   | Await further instructions.                                    |  |  |    |   |   |      |   |   |

56 List other material taught, but not listed above.

Definition of terms:

- 57 Y/N "Safe distance" from position  
58 Y/N Malfunction  
59 Y/N Hangfire  
60 Y/N Misfire
- 61 Y/N Students were told they would perform the misfire task in a HOT then COLD sequence.  
62 Y/N Students practiced the HOT then the COLD procedure.  
63 Y/N Students were first tested in the HOT then the COLD procedure.  
64 Y/N Students were told that a HOT battery was a misfire.  
65 Y/N Students were told that a COLD battery was a hangfire.  
66 Y/N Students were warned of dangers of touching battery.  
67 Y/N Students were told cause of a hot battery.  
68 Y/N Students were told cause of a cold battery.
- 69 Y/N Instructor used student handout as a training aid.  
70 Y/N Instructor used other training aids (handouts, sketches, FHT, tracker).  
List:
- 71 Y/N Instructor asked if students had any questions.  
72 Y/N There were student questions.  
List:
- 73 Y/N Critical points were stressed ("MISFIRE" is only stated two times).  
If so, what?
- 74 Y/N Memory cues were used.  
List:
- 75 Y/N Instructor called on each student during practice.  
76 Y/N Instructor used the same terms throughout instruction.  
77 Y/N Instructor emphasized sequence.  
78 Y/N Instructor immediately corrected errors during practice.  
79 Y/N Instructor gave initial demonstration of task.  
80 Y/N Instructor talked student through initial demonstration of task.

APPENDIX R

STUDENT OBSERVATION FORM:  
PERFORM MALFUNCTION PROCEDURES

Student: \_\_\_\_\_

Observer: \_\_\_\_\_

Date: \_\_\_\_\_

**PERFORM MALFUNCTION PROCEDURES ON  
AN M47 DRAGON MEDIUM ANTITANK WEAPON**

Time practice/test started: \_\_\_\_\_

Time practice/test ended: \_\_\_\_\_

Number of practice/test trials: \_\_\_\_\_

Trial received GO: 1 2 3

| Content |  | GO |   |   | NOGO |   |   |
|---------|--|----|---|---|------|---|---|
|         |  | 1  | 2 | 3 | 1    | 2 | 3 |
|         | <b>DRAGON FAILS TO FIRE</b>                                  |    |   |   |      |   |   |
|         | <b>HOT BATTERY:</b>  |    |   |   |      |   |   |
| 1       | Resqueeze the trigger and continue to track for 15 sec.      |    |   |   |      |   |   |
| 2       | Trigger must be depressed for the 15 sec.                    |    |   |   |      |   |   |
| 3       | Gunner did not touch the battery.                            |    |   |   |      |   |   |
|         | <b>IF THE ROUND STILL DOES NOT FIRE:</b>                     |    |   |   |      |   |   |
| 4       | Release trigger.   |    |   |   |      |   |   |
| 5       | Sound off "MISFIRE."   |    |   |   |      |   |   |
| 6       | Support round on shoulder with left hand under round.        |    |   |   |      |   |   |
| 7       | Turn head to see tracker battery.                            |    |   |   |      |   |   |
| 8       | With right hand, feel in the vicinity of tracker battery.    |    |   |   |      |   |   |
| 9       | Remove round from shoulder and gently set it on the ground.  |    |   |   |      |   |   |
| 10      | Remove tracker from round.                                   |    |   |   |      |   |   |
| 11      | Place round on ground, a safe distance from firing position. |    |   |   |      |   |   |
| 12      | Keep round pointed toward enemy.                             |    |   |   |      |   |   |
| 13      | Obtain other round.  |    |   |   |      |   |   |
| 14      | Mount tracker on new round.                                  |    |   |   |      |   |   |
| 15      | "Acquire previous or new target."                            |    |   |   |      |   |   |
| 16      | Sound off "I am continuing with the mission."                |    |   |   |      |   |   |
| 17      | Squeeze trigger lever bar.                                   |    |   |   |      |   |   |
|         | <b>DRAGON FAILS TO FIRE</b>                                  |    |   |   |      |   |   |
|         | <b>COLD BATTERY</b>  |    |   |   |      |   |   |
| 18      | Immediately resqueeze trigger.                               |    |   |   |      |   |   |
| 19      | Continue tracking for 15 sec.                                |    |   |   |      |   |   |
| 20      | Trigger is depressed throughout 15 sec.                      |    |   |   |      |   |   |
| 21      | Did not touch the battery.                                   |    |   |   |      |   |   |

| Content |  | GO |   |   | NOGO |   |   |
|---------|--|----|---|---|------|---|---|
|         |  | 1  | 2 | 3 | 1    | 2 | 3 |
|         | IF ROUND STILL DOES NOT FIRE:                                  |    |   |   |      |   |   |
| 22      | Release trigger.   |    |   |   |      |   |   |
| 23      | Sound off "MISFIRE".   |    |   |   |      |   |   |
| 24      | Support round with left hand.                                  |    |   |   |      |   |   |
| 25      | Turn head to see tracker battery.                              |    |   |   |      |   |   |
| 26      | Cautiously feel in vicinity of battery.                        |    |   |   |      |   |   |
| 27      | Remove round from shoulder.                                    |    |   |   |      |   |   |
| 28      | Set it on the ground.  |    |   |   |      |   |   |
| 29      | Release tracker.   |    |   |   |      |   |   |
| 30      | Move it forward until the electrical connectors break contact. |    |   |   |      |   |   |
| 31      | Apply downward pressure.                                       |    |   |   |      |   |   |
| 32      | Reseat tracker to round.                                       |    |   |   |      |   |   |
| 33      | Place round back on shoulder.                                  |    |   |   |      |   |   |
| 34      | "Acquire previous target."                                     |    |   |   |      |   |   |
| 35      | Sound off "I am continuing with the mission."                  |    |   |   |      |   |   |
| 36      | Squeeze trigger lever bar.                                     |    |   |   |      |   |   |
|         | IF ROUND FAILS TO FIRE:  |    |   |   |      |   |   |
| 37      | Feel in vicinity of tracker battery.                           |    |   |   |      |   |   |
|         | STILL COLD:  |    |   |   |      |   |   |
| 38      | Remove tracker from round.                                     |    |   |   |      |   |   |
| 39      | Carry round safe distance from enemy.                          |    |   |   |      |   |   |
| 40      | Keep round pointed toward enemy.                               |    |   |   |      |   |   |
| 41      | Obtain another round.  |    |   |   |      |   |   |
| 42      | Mount tracker on round.  |    |   |   |      |   |   |
| 43      | "Acquire previous or new target."                              |    |   |   |      |   |   |
| 44      | Sound off "I am continuing with the mission."                  |    |   |   |      |   |   |
| 45      | Squeeze trigger lever bar.                                     |    |   |   |      |   |   |
|         | IF SECOND ROUND FAILS TO FIRE:                                 |    |   |   |      |   |   |
| 46      | Feel in vicinity of tracker battery.                           |    |   |   |      |   |   |
|         | IF TRACKER BATTERY IS STILL COLD:                              |    |   |   |      |   |   |
| 47      | "Tracker is probably defective."                               |    |   |   |      |   |   |
| 48      | Remove tracker from round.                                     |    |   |   |      |   |   |
| 49      | Replace in carrying bag.                                       |    |   |   |      |   |   |
| 50      | Take to squad leader.  |    |   |   |      |   |   |
| 51      | "I will await further instructions."                           |    |   |   |      |   |   |



**TEST ONLY:**

- 53 Y/N Instructor asked leading questions to help the student pass the test.
- 54 Y/N Would you have passed this student?
- 55 Y/N Instructor stopped student when a mistake was made.
- 56 Y/N Instructor told student he made a mistake, but student was allowed to continue with the task.
- 57 Y/N Other occurrences (unusual weather, unexpected instructor replacements)?

**APPENDIX S**

**INSTRUCTOR OBSERVATION FORM:  
MAINTAIN THE DAY TRACKER AND ROUND**

Instructor: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

# MAINTAIN THE M47 MEDIUM ANTITANK WEAPON SYSTEM

Time instruction started: \_\_\_\_\_

Time instruction ended: \_\_\_\_\_

Time practice started: \_\_\_\_\_

Time practice ended: \_\_\_\_\_

## Student Summary (test)

| Taught |   |   | Content   | GO |   |   | NOGO |   |   |
|--------|---|---|---|----|---|---|------|---|---|
| Y      | N | ? |   | 1  | 2 | 3 | 1    | 2 | 3 |
|        |   |   | <b>TRACKER:</b>   |    |   |   |      |   |   |
| 1      |   |   | Check external surfaces for oil, dirt, grease, damage.                      |    |   |   |      |   |   |
| 2      |   |   | Clean metal parts with dry clean cloth.                                     |    |   |   |      |   |   |
| 3      |   |   | Clean rubber or synthetic parts with detergent and water.                   |    |   |   |      |   |   |
| 4      |   |   | Report damaged or outdated items to supervisor.                             |    |   |   |      |   |   |
| 5      |   |   | Inspect shock absorbers to insure they are present, tight, and not damaged. |    |   |   |      |   |   |
| 6      |   |   | <b>INSPECT LENSES:</b>  |    |   |   |      |   |   |
|        |   |   | If dirty, clean with lens brush.  |    |   |   |      |   |   |
| 7      |   |   | If still dirty, use lens tissue, wood dowel and ethyl alcohol.              |    |   |   |      |   |   |
| 8      |   |   | <b>PROCEDURE FOR CLEANING:</b>  |    |   |   |      |   |   |
|        |   |   | Check trigger lever to ensure will operate only when safety is pressed.     |    |   |   |      |   |   |
| 9      |   |   | Check for tears and dry rot.  |    |   |   |      |   |   |
| 10     |   |   | Do not check trigger lever when mated.                                      |    |   |   |      |   |   |
| 11     |   |   | Check metallic click.   |    |   |   |      |   |   |
| 12     |   |   | <b>INSPECT EYE GUARD:</b>   |    |   |   |      |   |   |
|        |   |   | Cracks, visible damage, and secure fit which allows rotation.               |    |   |   |      |   |   |
| 13     |   |   | Eye guard rotates independently from focus ring.                            |    |   |   |      |   |   |
| 14     |   |   | <b>LOOK THROUGH SIGHT:</b>  |    |   |   |      |   |   |
|        |   |   | Rotate focus adjustment ring to left and right.                             |    |   |   |      |   |   |
| 15     |   |   | Ensure visible focusing of reticle and target.                              |    |   |   |      |   |   |
| 16     |   |   | <b>ELECTRICAL CONNECTOR COVER:</b>  |    |   |   |      |   |   |
|        |   |   | Check for damage and secure fit.  |    |   |   |      |   |   |

| Taught |   |   | Content  |  |  | GO |   |   | NOGO |   |   |
|--------|---|---|--|--|--|----|---|---|------|---|---|
| Y      | N | ? |  |  |  | 1  | 2 | 3 | 1    | 2 | 3 |
| 17     |   |   | Check rubber cushion.  |  |  |    |   |   |      |   |   |
| 18     |   |   | Inspect access cover for loose screws (10) or damage.  |  |  |    |   |   |      |   |   |
| 19     |   |   | Inspect guide pins (4) for physical damage.  |  |  |    |   |   |      |   |   |
| 20     |   |   | ROUND:<br>Check humidity indicator; should be blue.  |  |  |    |   |   |      |   |   |
| 21     |   |   | Check forward and aft shock absorber for loose cushions cracks or visible damage.                                    |  |  |    |   |   |      |   |   |
| 22     |   |   | Check exterior surface for oil, dirt, grease.  |  |  |    |   |   |      |   |   |
| 23     |   |   | Inspect the launcher tube for gouges, cracks, punctures. Clean if necessary.   |  |  |    |   |   |      |   |   |
| 24     |   |   | Inspect tracker support assembly for damage and firm fit of cover on electrical connector.                           |  |  |    |   |   |      |   |   |
| 25     |   |   | Inspect electrical connector for damage.   |  |  |    |   |   |      |   |   |
| 26     |   |   | Inspect raceway conduit surface for dents, cracks or other damage.   |  |  |    |   |   |      |   |   |
| 27     |   |   | Check electrical cable nipple and two terminals.   |  |  |    |   |   |      |   |   |
| 28     |   |   | Inspect tracker battery for dents, punctures, cracks and that it is secure.  |  |  |    |   |   |      |   |   |
| 29     |   |   | Inspect carrying sling for rips, tears, etc. so it will support weight of round.                                     |  |  |    |   |   |      |   |   |
| 30     |   |   | Inspect bipod for damage.  |  |  |    |   |   |      |   |   |
| 31     |   |   | Do not unsnap the retaining strap during the preoperational inspection.  |  |  |    |   |   |      |   |   |
| 32     |   |   | INSPECT ROUND FOR LEGIBLE MARKINGS:<br>Blue for training, black and yellow for high explosive, brown for back blast. |  |  |    |   |   |      |   |   |
| 33     |   |   | Data plate (16 years).   |  |  |    |   |   |      |   |   |

34. List other material taught, but not listed above.

Definition of terms:

- 35 Y/N Raceway conduit
- 36 Y/N Cable nipple
- 37 Y/N Cable terminals
- 38 Y/N Guide pin
- 39 Y/N Focus adjustment ring
- 40 Y/N Electrical connector
- 41 Y/N Access cover
- 42 Y/N Humidity indicator
  
- 43 Y/N Instructor used student handout as a training aid.
- 44 Y/N Instructor used other training aids (handouts, tracker, FHT).  
List:  
  
- 45 Y/N *Instructor called on each student during practice.*
- 46 Y/N Instructor used the same terms throughout instruction.
- 47 Y/N Instructor emphasized sequence.
- 48 Y/N Instructor immediately corrected errors during practice.
- 49 Y/N Instructor gave initial demonstration of task.
- 50 Y/N Instructor talked student through initial demonstration of task.
- 51 Y/N Key points were stressed.  
If so, what?
  
- 52 Y/N Memory cues were used (DOG = dirt, oil, grease).  
List:  
  
- 53 Y/N A specific order was specified.
- 54 Y/N Instructor asked if students had questions.
- 55 Y/N *There were student questions.*  
List:

APPENDIX T

STUDENT OBSERVATION FORM:  
MAINTAIN THE DAY TRACKER AND ROUND

Student: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

### MAINTAIN THE M47 MEDIUM ANTITANK WEAPON SYSTEM

Time practice/test started: \_\_\_\_\_  
 Number of practice/test trials: \_\_\_\_\_

Time practice/test ended: \_\_\_\_\_  
 Trial received GO: 1 2 3

| Content |   | GO |   |   | NOGO |   |   |
|---------|---|----|---|---|------|---|---|
|         |   | 1  | 2 | 3 | 1    | 2 | 3 |
| 1       | Check external surfaces for oil, dirt, grease, damage.  |    |   |   |      |   |   |
| 2       | Inspect shock absorbers to insure they are present, tight, and not damaged.   |    |   |   |      |   |   |
| 3       | Inspect lenses. If dirty, clean with lens tissue, wood dowel, and ethyl alcohol.  |    |   |   |      |   |   |
| 4       | Check trigger lever to ensure will operate only when safety is pressed. Check for tears and and dry rot.                            |    |   |   |      |   |   |
| 5       | Check metallic click.   |    |   |   |      |   |   |
| 6       | Inspect eye guard for cracks, visible damage and secure fit which allows rotation. Eye guard rotates independently from focus ring. |    |   |   |      |   |   |
| 7       | Look through sight and rotate focus adjustment ring to left and right.  |    |   |   |      |   |   |
| 8       | Ensure visible focusing of reticle and target.  |    |   |   |      |   |   |
| 9       | Check electrical connector for damage and secure fit. Check rubber cushion.   |    |   |   |      |   |   |
| 10      | Inspect electrical connector for damage or dirt.  |    |   |   |      |   |   |
| 11      | Inspect access cover for loose screws (10) or damage.   |    |   |   |      |   |   |
| 12      | Inspect guide pins (4) for physical damage.   |    |   |   |      |   |   |
| 13      | Check humidity indicator; should be blue.   |    |   |   |      |   |   |
| 14      | Check forward and aft shock absorber for loose cushions, cracks or visible damage.  |    |   |   |      |   |   |
| 15      | Check exterior surface for oil, dirt, grease. Inspect the launcher tube for gouges, cracks, punctures.                              |    |   |   |      |   |   |
| 16      | Inspect tracker support assembly for damage and firm fit of cover on electrical connector.  |    |   |   |      |   |   |
| 17      | Inspect electrical connector for damage.  |    |   |   |      |   |   |

| Content |   | GO |   |   | NOGO |   |   |
|---------|---|----|---|---|------|---|---|
|         |   | 1  | 2 | 3 | 1    | 2 | 3 |
| 17      | Inspect raceway conduit surface for dents, cracks or other damage.  |    |   |   |      |   |   |
| 18      | Check electrical cable nipple and two terminals.  |    |   |   |      |   |   |
| 19      | Inspect thermal battery.  |    |   |   |      |   |   |
| 20      | Inspect aft shock absorber for loose cushions, cracks or other damage.  |    |   |   |      |   |   |
| 21      | Inspect carrying sling for rips, tears, etc. so it will support weight of round.  |    |   |   |      |   |   |
| 22      | Inspect bipod for damage.   |    |   |   |      |   |   |
| 23      | Inspect round for legible markings:<br>Blue for training, black and yellow for high explosive, brown for back blast, data plate (16 years). |    |   |   |      |   |   |

TEST ONLY:

- 24 Y/N Instructor asked leading questions to help the student pass the test.
- 25 Y/N Would you have passed this student?
- 26 Y/N Instructor stopped student when a mistake was made.
- 27 Y/N Instructor told student he made a mistake, but student was allowed to continue with the task.
- 28 Y/N Other occurrences (unusual weather, unexpected instructor assignments)?



## APPENDIX U

INSTRUCTOR OBSERVATION FORM:  
OPERATE NIGHT SIGHT (AN/TAS-5)

Instructor: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

### OPERATE A NIGHT VISION SIGHT (AN/TAS-5)

Time instruction started: \_\_\_\_\_  
Time practice started: \_\_\_\_\_

Time instruction ended: \_\_\_\_\_  
Time practice ended: \_\_\_\_\_

|        |  | Student Summary |   |   |                |   |   |  |  |  |
|--------|--|-----------------|---|---|----------------|---|---|--|--|--|
|        |  | GO              |   |   | (test)<br>NOGO |   |   |  |  |  |
| Taught | Content  | 1               | 2 | 3 | 1              | 2 | 3 |  |  |  |
| Y      | N ?  |                 |   |   |                |   |   |  |  |  |
| 1      | Check external surface for dirt, oil, grease and damage.   |                 |   |   |                |   |   |  |  |  |
| 2      | Clean metal parts with dry, clean cloth.   |                 |   |   |                |   |   |  |  |  |
| 3      | Clean rubber or synthetic parts with detergent and water.  |                 |   |   |                |   |   |  |  |  |
| 4      | Inspect shock absorbers to insure they are secured to night tracker and not damaged.                                       |                 |   |   |                |   |   |  |  |  |
| 5      | Check trigger lever bar to insure it will not operate unless safety plunger is depressed.                                  |                 |   |   |                |   |   |  |  |  |
| 6      | When safety and lever are depressed, lever will click.   |                 |   |   |                |   |   |  |  |  |
| 7      | Check safety plunger boot and trigger lever for tears and dry rot.   |                 |   |   |                |   |   |  |  |  |
| 8      | Check electrical connector cover for dents and secure fit.   |                 |   |   |                |   |   |  |  |  |
| 9      | Insure rubber cushion is present and there are no tears or dry rot.  |                 |   |   |                |   |   |  |  |  |
| 10     | Check electrical connector cover for damage and dirty contacts.  |                 |   |   |                |   |   |  |  |  |
| 11     | Insure seal is present and no dry rot.   |                 |   |   |                |   |   |  |  |  |
| 12     | Inspect access cover for dents, punctures, and protruding wires.   |                 |   |   |                |   |   |  |  |  |
| 13     | Insure access cover screws (10) are present and tight.   |                 |   |   |                |   |   |  |  |  |
| 14     | Inspect guide pins (4) for damage or missing.  |                 |   |   |                |   |   |  |  |  |
| 15     | Gunner said, "I will inspect AN/TAS-5 like day tracker, except the lenses, eyeguard, and battery/coolant cartridge check." |                 |   |   |                |   |   |  |  |  |
| 16     | Remove lens cover and secure to front shock absorber.  |                 |   |   |                |   |   |  |  |  |
| 17     | Inspect lens for dirt, cracks, chips, or moisture inside lens.   |                 |   |   |                |   |   |  |  |  |
| 18     | To clean lens, take a deep breath and blow on lens.  |                 |   |   |                |   |   |  |  |  |

| Taught |     | Content  | GO |   |   | NOGO |   |   |
|--------|-----|--|----|---|---|------|---|---|
| Y      | N ? |  | 1  | 2 | 3 | 1    | 2 | 3 |
| 19     |     | If still dirty or smudged, clean with ethyl alcohol and cotton pad.  |    |   |   |      |   |   |
| 20     |     | Clean lens from side to side.  |    |   |   |      |   |   |
| 21     |     | Inspect eye guard for tears and dry rot.   |    |   |   |      |   |   |
| 22     |     | Inspect security shutters so they open & close.  |    |   |   |      |   |   |
| 23     |     | Eye guard should rotate independently from bezel ring.   |    |   |   |      |   |   |
| 24     |     | Check battery and coolant cartridge.   |    |   |   |      |   |   |
| 25     |     | Ensure they are mounted & no visible damage.   |    |   |   |      |   |   |
| 26     |     | Conduct an operational check by using battery power.   |    |   |   |      |   |   |
| 27     |     | Rotate actuator switch counterclockwise from the OFF/LOCK position to the AIR/BATT position.                       |    |   |   |      |   |   |
| 28     |     | Actuator switch has four different positions.  |    |   |   |      |   |   |
| 29     |     | Coolant pressure gauge should not read less than 2500 psi.   |    |   |   |      |   |   |
| 30     |     | Sight through eyepiece.  |    |   |   |      |   |   |
| 31     |     | If coolant cartridge monitor light in upper left is ON, replace coolant cartridge.                                 |    |   |   |      |   |   |
| 32     |     | If battery monitor light in upper right is ON or the reticle is not illuminated, replace battery.                  |    |   |   |      |   |   |
| 33     |     | Lights are red LED.  |    |   |   |      |   |   |
| 34     |     | Secure lens cover.   |    |   |   |      |   |   |
| 35     |     | Secure on velcro.  |    |   |   |      |   |   |
| 36     |     | Move actuator switch counterclockwise from AIR/BATT check position to ON, and wait 15 seconds for tracker to cool. |    |   |   |      |   |   |
| 37     |     | Look through eyepiece and focus on object.   |    |   |   |      |   |   |
| 38     |     | Adjust reticle ring for best focus of reticle.   |    |   |   |      |   |   |
| 39     |     | Adjust the BRT (brightness) control to obtain a blood red picture.   |    |   |   |      |   |   |

| Taught |   |   | Content   | GO |   |   | NOGO |   |   |
|--------|---|---|---|----|---|---|------|---|---|
| Y      | N | ? |   | 1  | 2 | 3 | 1    | 2 | 3 |
| 40     |   |   | Adjust the CTRS (contrast) control to filter out unwanted objects in field of view. |    |   |   |      |   |   |
| 41     |   |   | Adjust both controls for best image.  |    |   |   |      |   |   |
| 42     |   |   | Adjust range focus lever to obtain sharpest image.                                  |    |   |   |      |   |   |
| 43     |   |   | Turn actuator switch clockwise to OFF/LOCK and replace lens cover.                  |    |   |   |      |   |   |

44. List other material taught, but not listed above.

Definition of terms:

- 45 Y/N PSI
- 46 Y/N IR
- 47 Y/N LED
- 48 Y/N BRT
- 49 Y/N CTRS
- 50 Y/N Actuator
- 51 Y/N Reticle

52 Y/N Instructor told students to say, "I will inspect the AN/TAS-5 the same way as the day tracker, with the exception of the lenses, eye guard and battery/coolant check."

53 Y/N Instructor told students why cleaning motion is side to side (if lens is scratched, will not be noticeable with IR).

54 Y/N Instructor used student handout as a training aid.

55 Y/N Instructor used other training aids (handouts, sketches, AN/TAS-5).  
List:

56 Y/N Instructor asked if students had any questions.

57 Y/N There were questions.  
List:

58 Y/N Critical points were stressed (If bottle is released during testing the student fails). If so, what?

- 59 Y/N Memory cues used.  
List:
- 60 Y/N Instructor called on each student during practice to identify parts/components.
- 61 Y/N Instructor used the same terms throughout instruction.
- 62 Y/N Instructor emphasized sequence.
- 63 Y/N Instructor immediately corrected errors during practice.
- 64 Y/N Instructor gave initial demonstration of task.
- 65 Y/N Instructor talked student through initial demonstration of task.

APPENDIX V

STUDENT OBSERVATION FORM:  
OPERATE NIGHT SIGHT (AN/TAS-5)

Student: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

### OPERATE A NIGHT VISION SIGHT (AN/TAS-5)

Time practice/test started: \_\_\_\_\_ Time practice/test ended: \_\_\_\_\_  
 Number of practice/test trials: \_\_\_\_\_ Trial received GO: 1 2 3

| Content |  | GO |   |   | NOGO |   |   |
|---------|--|----|---|---|------|---|---|
|         |  | 1  | 2 | 3 | 1    | 2 | 3 |
| 1       | Check external surface for dirt, oil, grease and damage.   |    |   |   |      |   |   |
| 2       | Clean metal parts with dry, clean cloth.   |    |   |   |      |   |   |
| 3       | Clean rubber or synthetic parts with detergent and water.  |    |   |   |      |   |   |
| 4       | Inspect shock absorbers to insure they are secured to night tracker and not damaged.                                       |    |   |   |      |   |   |
| 5       | Check trigger lever bar to insure it will not operate unless safety plunger is depressed.                                  |    |   |   |      |   |   |
| 6       | When safety and lever are depressed, lever will click.   |    |   |   |      |   |   |
| 7       | Check safety plunger boot and trigger lever for tears and dry rot.   |    |   |   |      |   |   |
| 8       | Check electrical connector cover for dents and secure fit.   |    |   |   |      |   |   |
| 9       | Insure rubber cushion is present and there are no tears or dry rot.  |    |   |   |      |   |   |
| 10      | Check electrical connector cover for damage and dirty contacts.  |    |   |   |      |   |   |
| 11      | Insure seal is present and no dry rot.   |    |   |   |      |   |   |
| 12      | Inspect access cover for dents, punctures, and protruding wires. Insure access cover screws (10) are present and tight.    |    |   |   |      |   |   |
| 13      | Inspect guide pins (4) for damage or missing.  |    |   |   |      |   |   |
| 14      | Gunner said, "I will inspect AN/TAS-5 like day tracker, except the lenses, eyeguard, and battery/coolant cartridge check." |    |   |   |      |   |   |
| 15      | Remove lens cover and secure to front shock absorber.  |    |   |   |      |   |   |
| 16      | Inspect lens for dirt, cracks, chips, or moisture inside lens.   |    |   |   |      |   |   |
| 17      | To clean lens, take a deep breath and blow on lens.  |    |   |   |      |   |   |
| 18      | If still dirty or smudged, clean with ethyl alcohol and cotton pad.  |    |   |   |      |   |   |
|         | Clean lens from side to side.  |    |   |   |      |   |   |

| Content |  | GO |   |   | NOGO |   |   |
|---------|--|----|---|---|------|---|---|
|         |  | 1  | 2 | 3 | 1    | 2 | 3 |
| 19      | Inspect eye guard for tears and dry rot.   |    |   |   |      |   |   |
| 20      | Inspect security shutters so they open & close.  |    |   |   |      |   |   |
| 21      | Eye guard should rotate independently from bezel ring.   |    |   |   |      |   |   |
| 22      | Check battery and coolant cartridge.   |    |   |   |      |   |   |
| 23      | Ensure they are mounted & no visible damage.   |    |   |   |      |   |   |
| 24      | Conduct an operational check by using battery power.   |    |   |   |      |   |   |
| 25      | Rotate actuator switch counterclockwise from the OFF/LOCK position to the AIR/BATT position.                       |    |   |   |      |   |   |
| 26      | Actuator switch has four different positions.  |    |   |   |      |   |   |
| 27      | Coolant pressure gauge should not read less than 2500 psi.   |    |   |   |      |   |   |
| 28      | Sight through eyepiece.  |    |   |   |      |   |   |
| 29      | If coolant cartridge monitor light in upper left is ON, replace coolant cartridge.                                 |    |   |   |      |   |   |
| 30      | If battery monitor light in upper right is ON or the reticle is not illuminated, replace battery.                  |    |   |   |      |   |   |
| 31      | Lights are red LED.  |    |   |   |      |   |   |
| 32      | Secure lens cover and secure on velcro.  |    |   |   |      |   |   |
| 33      | Move actuator switch counterclockwise from AIR/BATT check position to ON, and wait 15 seconds for tracker to cool. |    |   |   |      |   |   |
| 34      | Look through eyepiece and focus on object.   |    |   |   |      |   |   |
| 35      | Adjust reticle ring for best focus of reticle.   |    |   |   |      |   |   |
| 36      | Adjust the BRT (brightness) control to obtain a blood red picture.   |    |   |   |      |   |   |
| 37      | Adjust the CTRS (contrast) control to filter out unwanted objects in field of view.                                |    |   |   |      |   |   |
| 38      | Adjust both controls for best image.   |    |   |   |      |   |   |
| 39      | Adjust range focus lever to obtain sharpest image.   |    |   |   |      |   |   |
| 40      | Turn actuator switch clockwise to OFF/LOCK and replace lens cover.   |    |   |   |      |   |   |



TEST ONLY:

- 41 Y/N Instructor asked leading questions to help the student pass the test.
- 42 Y/N Would you have passed this student?
- 43 Y/N Instructor stopped student when a mistake was made.
- 44 Y/N Instructor told student he made a mistake, but student was allowed to continue with task.
- 45 Y/N Other occurrences (unusual weather, unexpected instructor assignments)?

APPENDIX W

INSTRUCTOR OBSERVATION FORM:  
RESTORE DRAGON TO CARRY CONFIGURATION

Instructor: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

# RESTORE AN M47 MEDIUM ANTITANK WEAPON TO THE CARRY CONFIGURATION

Time instruction started: \_\_\_\_\_ Time instruction ended: \_\_\_\_\_  
Time practice started: \_\_\_\_\_ Time practice ended: \_\_\_\_\_

|        |  | Student Summary |   |   |      |   |   |
|--------|--|-----------------|---|---|------|---|---|
|        |  | (test)          |   |   |      |   |   |
| Taught | Content  | GO              |   |   | NOGO |   |   |
|        |  | 1               | 2 | 3 | 1    | 2 | 3 |
| 1      | Y N ? Remove tracker from round.                                     |                 |   |   |      |   |   |
| 2      | Use thumb of left hand.  |                 |   |   |      |   |   |
| 3      | Pull spring clip away from guide pin.                                |                 |   |   |      |   |   |
| 4      | Hold spring clip.  |                 |   |   |      |   |   |
| 5      | Push forward on tracker rear shock absorber.                         |                 |   |   |      |   |   |
| 6      | Free tracker from guide rails.                                       |                 |   |   |      |   |   |
| 7      | Grasp tracker by optical tube.                                       |                 |   |   |      |   |   |
| 8      | Remove tracker from round.   |                 |   |   |      |   |   |
| 9      | Replace electrical connector cover on connector.                     |                 |   |   |      |   |   |
| 10     | Replace tracker in carrying bag.                                     |                 |   |   |      |   |   |
| 11     | Ensure tracker is in bag with the eye guard up.                      |                 |   |   |      |   |   |
| 12     | Ensure access cover is facing the padded side of the bag.            |                 |   |   |      |   |   |
| 13     | Close bag.   |                 |   |   |      |   |   |
| 14     | Restore round to carry configuration.                                |                 |   |   |      |   |   |
| 15     | Replace forward shock absorber.                                      |                 |   |   |      |   |   |
| 16     | Set round in upright position.                                       |                 |   |   |      |   |   |
| 17     | Rear shock absorber on ground.                                       |                 |   |   |      |   |   |
| 18     | Push down lightly on bipod.  |                 |   |   |      |   |   |
| 19     | Release bipod safety catch.  |                 |   |   |      |   |   |
| 20     | Lift brace out of locking slot.                                      |                 |   |   |      |   |   |
| 21     | Push down on bipod until upper part is parallel with muzzle of tube. |                 |   |   |      |   |   |
| 22     | Align grooved portion of shock absorber with bipod at the muzzle.    |                 |   |   |      |   |   |
| 23     | Push down on shock absorber.   |                 |   |   |      |   |   |
| 24     | Lower bipod against round.   |                 |   |   |      |   |   |
| 25     | Ensure upper part of bipod engages shock absorber.                   |                 |   |   |      |   |   |
| 26     | Ensure shock absorber is secure.                                     |                 |   |   |      |   |   |
| 27     | Retract bipod legs.  |                 |   |   |      |   |   |
| 28     | Secure to round with strap.  |                 |   |   |      |   |   |
| 29     | Replace electrical connector cover on connector.                     |                 |   |   |      |   |   |

30. List other material taught, but not listed above.
- 31 Y/N A specific order was stressed.
- 32 Y/N Instructor used student handout as a training aid.
- 33 Y/N Instructor used other training aids (handouts, sketches).  
List:
- 34 Y/N Instructor asked if students had any questions.
- 35 Y/N There were questions.  
List:
- 36 Y/N Memory cues were used.  
List:
- 37 Y/N Critical points were stressed (Imaginary electrical connector on round).  
If so, what?
- 38 Y/N Instructor called on each student during practice to identify parts/components.
- 39 Y/N Instructor used the same terms throughout instruction.
- 40 Y/N Instructor emphasized sequence.
- 41 Y/N Instructor immediately corrected errors during practice.
- 42 Y/N Instructor gave initial demonstration of task.
- 43 Y/N Instructor talked student through initial demonstration of task.

APPENDIX X

STUDENT OBSERVATION FORM:  
RESTORE DRAGON TO CARRY CONFIGURATION

Student: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

# RESTORE AN M47 MEDIUM ANTITANK WEAPON TO THE CARRY CONFIGURATION

Time practice/test started: \_\_\_\_\_  
Number of practice/test trials: \_\_\_\_\_

Time practice/test ended: \_\_\_\_\_  
Trial received GO: 1 2 3

| Content   | GO |   |   | NOGO |   |   |
|---|----|---|---|------|---|---|
|   | 1  | 2 | 3 | 1    | 2 | 3 |
| 1 Remove tracker from round.  |    |   |   |      |   |   |
| 2 Use thumb of left hand.   |    |   |   |      |   |   |
| 3 Pull spring clip away from guide pin.                                 |    |   |   |      |   |   |
| 4 Hold spring clip.   |    |   |   |      |   |   |
| 5 Push forward on tracker rear shock absorber.                          |    |   |   |      |   |   |
| 6 Free tracker from guide rails.  |    |   |   |      |   |   |
| 7 Grasp tracker by optical tube.  |    |   |   |      |   |   |
| 8 Remove tracker from round.  |    |   |   |      |   |   |
| 9 Replace electrical connector cover on connector.                      |    |   |   |      |   |   |
| 10 Replace tracker in carrying bag.                                     |    |   |   |      |   |   |
| 11 Ensure tracker is in bag with the eye guard up.                      |    |   |   |      |   |   |
| 12 Ensure access cover is facing the padded side of the bag.            |    |   |   |      |   |   |
| 13 Close bag.   |    |   |   |      |   |   |
| 14 Restore round to carry configuration.                                |    |   |   |      |   |   |
| 15 Replace forward shock absorber.                                      |    |   |   |      |   |   |
| 16 Set round in upright position.                                       |    |   |   |      |   |   |
| 17 Rear shock absorber on ground.                                       |    |   |   |      |   |   |
| 18 Push down lightly on bipod.  |    |   |   |      |   |   |
| 19 Release bipod safety catch.  |    |   |   |      |   |   |
| 20 Lift brace out of locking slot.                                      |    |   |   |      |   |   |
| 21 Push down on bipod until upper part is parallel with muzzle of tube. |    |   |   |      |   |   |
| 22 Align grooved portion of shock absorber with bipod at the muzzle.    |    |   |   |      |   |   |
| 23 Push down on shock absorber.   |    |   |   |      |   |   |
| 24 Lower bipod against round.   |    |   |   |      |   |   |
| 25 Ensure upper part of bipod engages shock absorber.                   |    |   |   |      |   |   |
| 26 Ensure shock absorber is secure.                                     |    |   |   |      |   |   |
| 27 Retract bipod legs.  |    |   |   |      |   |   |
| 28 Secure to round with strap.  |    |   |   |      |   |   |
| 29 Replace electrical connector cover on connector.                     |    |   |   |      |   |   |

**TEST ONLY:**

- 30 Y/N Instructor asked leading questions to help the student pass the test.
- 31 Y/N Would you have passed this student?
- 32 Y/N Instructor stopped student when a mistake was made.
- 33 Y/N Instructor told student he made a mistake, but student was allowed to continued with task.
- 34 Y/N Other occurrences (unusual weather, unexpected instructor assignments)?

**APPENDIX Y**

**INSTRUCTOR OBSERVATION FORM:  
DEMONSTRATE DRAGON FIRING POSITIONS**



Instructor: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

# DEMONSTRATE A CORRECT M47 MEDIUM ANTITANK WEAPON FIRING POSITION

Time instruction started: \_\_\_\_\_  
Time practice started: \_\_\_\_\_

Time instruction ended: \_\_\_\_\_  
Time practice ended: \_\_\_\_\_

## Student Summary (test)

| Taught? |   | Content  | GO |   |   | NOGO |   |   |
|---------|---|--|----|---|---|------|---|---|
| Y       | N |  | 1  | 2 | 3 | 1    | 2 | 3 |
|         |   | COMMON FOR ALL POSITIONS:  |    |   |   |      |   |   |
| 1       |   | Place launcher close to curve of neck.   |    |   |   |      |   |   |
| 2       |   | Weight of round rests on muscle, not bone.   |    |   |   |      |   |   |
| 3       |   | Grasp optical tube with left hand.   |    |   |   |      |   |   |
| 4       |   | Curl thumb under optical tube.   |    |   |   |      |   |   |
| 5       |   | Grasp trigger lever with right hand.   |    |   |   |      |   |   |
| 6       |   | Thumb on safety plunger.   |    |   |   |      |   |   |
| 7       |   | Three fingers on trigger lever.  |    |   |   |      |   |   |
| 8       |   | Little finger forward of trigger bar.  |    |   |   |      |   |   |
|         |   | SITTING:   |    |   |   |      |   |   |
| 9       |   | Sit flat on ground.  |    |   |   |      |   |   |
| 10      |   | Legs extended as far as possible.  |    |   |   |      |   |   |
| 11      |   | Heel of boots on bipod legs.   |    |   |   |      |   |   |
| 12      |   | Lean forward at waist as far as possible.  |    |   |   |      |   |   |
| 13      |   | Remove slack, apply constant downward and rearward pressure on tracker while pushing |    |   |   |      |   |   |
| 14      |   | Push out with feet.  |    |   |   |      |   |   |
| 15      |   | Tuck elbows in, close together beneath round.  |    |   |   |      |   |   |
| 16      |   | Press right eye tightly against eye guard and hold.                                  |    |   |   |      |   |   |
| 17      |   | Left eye stays closed.   |    |   |   |      |   |   |
|         |   | STANDING SUPPORTED:  |    |   |   |      |   |   |
| 18      |   | Set bipod legs, place round on shoulder.   |    |   |   |      |   |   |
| 19      |   | Spread legs a comfortable distance apart.  |    |   |   |      |   |   |
| 20      |   | Legs straight.   |    |   |   |      |   |   |
| 21      |   | Lean forward against the wall of foxhole.  |    |   |   |      |   |   |
| 22      |   | Keep elbows tucked in.   |    |   |   |      |   |   |
| 23      |   | Remove slack. Lean slightly forward at the waist.                                    |    |   |   |      |   |   |
| 24      |   | Grasp tracker and straighten-up slightly.  |    |   |   |      |   |   |
| 25      |   | Place eye firmly in eyepiece.  |    |   |   |      |   |   |
| 26      |   | Pull down and back on tracker.   |    |   |   |      |   |   |
| 27      |   | Rest of engagement is same as sitting.   |    |   |   |      |   |   |

| Taught? |   | Content   | GO |   |   | NOGO |   |   |
|---------|---|---|----|---|---|------|---|---|
| Y       | N |   | 1  | 2 | 3 | 1    | 2 | 3 |
|         |   | KNEELING:   |    |   |   |      |   |   |
| 28      |   | Assume an upright kneeling position.  |    |   |   |      |   |   |
| 29      |   | Spread knees a comfortable distance apart.  |    |   |   |      |   |   |
| 30      |   | Rotate head so eye is in eyeguard.  |    |   |   |      |   |   |
| 31      |   | From the waist up, keep body same as in other firing position.                              |    |   |   |      |   |   |
|         |   | PRONE:  |    |   |   |      |   |   |
| 32      |   | Assume prone position.  |    |   |   |      |   |   |
| 33      |   | Keep bipod legs secured to body of round.   |    |   |   |      |   |   |
| 34      |   | Grasp optical tube with left hand.  |    |   |   |      |   |   |
| 35      |   | Place right arm under round.  |    |   |   |      |   |   |
| 36      |   | Grasp trigger mechanism.  |    |   |   |      |   |   |
| 37      |   | Keep body positioned at least a 90 degree angle from direction of fire.                     |    |   |   |      |   |   |
| 38      |   | Keep legs out of back blast area.   |    |   |   |      |   |   |
| 39      |   | Place eye in eyeguard and hold weapon as tight as possible.                                 |    |   |   |      |   |   |
| 40      |   | Round must have at least 6 inches of clearance at the muzzle end to prevent damage to fins. |    |   |   |      |   |   |
| 41      |   | Prone position is unstable and dangerous.   |    |   |   |      |   |   |
| 42      |   | Difficult to track.   |    |   |   |      |   |   |

43 List other material taught, but not listed above.

44 Y/N The 30 second time limit was encouraged during practice.

45 Y/N The 30 second time limit was strictly enforced during testing.

46 Y/N A specific order was specified.

47 Y/N Instructor used student handout as a training aid.

48 Y/N Instructor used other training aids (handouts, sketches).  
List:

49 Y/N Key points were stressed.  
If so, what?

50 Y/N Memory cues were used (left hand is shaped like a "C").  
List:

- 51 Y/N Instructor called on each student during practice.
- 52 Y/N Instructor used the same terms throughout instruction.
- 53 Y/N Instructor emphasized sequence.
- 54 Y/N Instructor immediately corrected errors during practice.
- 55 Y/N Instructor gave initial demonstration of task.
- 56 Y/N Instructor talked student through initial demonstration of task.

**APPENDIX Z**

**STUDENT OBSERVATION FORM:  
DEMONSTRATE DRAGON FIRING POSITIONS**

Student: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

# DEMONSTRATE A CORRECT M47 MEDIUM ANTITANK WEAPON FIRING POSITION

Time practice/test started: \_\_\_\_\_  
Number of practice/test trials: \_\_\_\_\_

Time practice/test ended: \_\_\_\_\_  
Trial received GO: 1 2 3 \_\_\_\_\_

|                    | Trial 1 | Practice/Test<br>Trial 2 | Trial 3 |
|--------------------|---------|--------------------------|---------|
| Sitting            | GO/NOGO | GO/NOGO                  | GO/NOGO |
| Standing Supported | GO/NOGO | GO/NOGO                  | GO/NOGO |
| Kneeling           | GO/NOGO | GO/NOGO                  | GO/NOGO |
| Prone              | GO/NOGO | GO/NOGO                  | GO/NOGO |

\*\*\*\*\*

| Content |   | GO |   |   | NOGO |   |   |
|---------|---|----|---|---|------|---|---|
|         |   | 1  | 2 | 3 | 1    | 2 | 3 |
|         | COMMON FOR ALL POSITIONS:   |    |   |   |      |   |   |
| 1       | Grasp optical tube with left hand. Curl thumb under optical tube.   |    |   |   |      |   |   |
| 2       | Grasp trigger lever with right hand, thumb on safety plunger, three fingers on trigger lever bar, and little finger forward of trigger bar. |    |   |   |      |   |   |
| 3       | Tuck elbows in, close together beneath round.   |    |   |   |      |   |   |
| 4       | Press right eye tightly against eye guard and hold. Left eye stays closed.  |    |   |   |      |   |   |
|         | SITTING:  |    |   |   |      |   |   |
| 5       | Sit flat on ground, legs extended as far as possible, heel of boots on bipod legs.  |    |   |   |      |   |   |
| 6       | Lean forward at waist as far as possible. Place launcher close to curve of neck with weight of round resting on muscle, not bone.           |    |   |   |      |   |   |
| 7       | Remove slack, apply constant downward and rearward pressure on tracker while pushing out with feet.   |    |   |   |      |   |   |
|         | STANDING SUPPORTED:   |    |   |   |      |   |   |
| 8       | Set bipod legs, place round on shoulder. Spread legs a comfortable distance apart, legs straight.   |    |   |   |      |   |   |
| 9       | Lean forward against the wall of foxhole.   |    |   |   |      |   |   |
| 10      | Keep elbows tucked in.  |    |   |   |      |   |   |
| 11      | Remove slack. Lean slightly forward at the waist, grasp tracker and straighten-up slightly.   |    |   |   |      |   |   |

| Content   | GO |   |   | NOGO |   |   |
|---|----|---|---|------|---|---|
|   | 1  | 2 | 3 | 1    | 2 | 3 |
| 12 Place eye firmly in eyepiece.  |    |   |   |      |   |   |
| 13 Pull down and back on tracker.   |    |   |   |      |   |   |
| 14 Rest of engagement is same as sitting.   |    |   |   |      |   |   |
| 15 KNEELING:<br>With round prepared for firing, assume an upright kneeling position. Spread knees a comfortable distance apart. |    |   |   |      |   |   |
| 16 Rotate head so eye is in eyeguard.   |    |   |   |      |   |   |
| 17 From the waist up, keep body same as in other firing position.   |    |   |   |      |   |   |
| 18 PRONE:<br>Assume prone position. Keep bipod legs secured to body of round.   |    |   |   |      |   |   |
| 19 Grasp optical tube with left hand.   |    |   |   |      |   |   |
| 20 Place right arm under round, grasping trigger mechanism.   |    |   |   |      |   |   |
| 21 Keep body positioned at least a 90 degree angle from direction of fire.  |    |   |   |      |   |   |
| 22 Keep legs out of back blast area.  |    |   |   |      |   |   |
| 23 Place eye in eyeguard and hold weapon as tight as possible.  |    |   |   |      |   |   |
| 24 Round must have at least 6 inches of clearance at the muzzle end to prevent damage to fins.                                  |    |   |   |      |   |   |

TEST ONLY:

- 25 Y/N Instructor asked leading questions to help the student pass the test.
- 26 Y/N Would you have passed this student?
- 27 Y/N Instructor stopped student when a mistake was made.
- 28 Y/N Instructor told student he made a mistake, but student was allowed to continued with task.
- 29 Y/N Other occurrences (unusual weather, unexpected instructor assignments)?

APPENDIX AA

INSTRUCTOR OBSERVATION FORM:  
CONSTRUCT A FIGHTING POSITION

Instructor: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

# CONSTRUCT A FIGHTING POSITION FOR AN M47 MEDIUM ANTITANK WEAPON

Time instruction started: \_\_\_\_\_  
Time practice started: \_\_\_\_\_

Time instruction ended: \_\_\_\_\_  
Time practice ended: \_\_\_\_\_

## Student Summary (test)

| Taught? |   | Content   | GO |   |   | NOGO |   |   |
|---------|---|---|----|---|---|------|---|---|
| Y       | N |   | 1  | 2 | 3 | 1    | 2 | 3 |
| 1       |   | Dragon can be employed from hasty or improved positions.  |    |   |   |      |   |   |
| 2       |   | Fighting position is a firing position.   |    |   |   |      |   |   |
| 3       |   | Sited and oriented to cover a sector of fire.   |    |   |   |      |   |   |
| 4       |   | Constructed to accommodate the weapon system and firer.   |    |   |   |      |   |   |
| 5       |   | After receiving a sector of fire and firing location:<br>Prepare and position weapon to cover sector. |    |   |   |      |   |   |
| 6       |   | Clear fields of fire (only what is necessary).  |    |   |   |      |   |   |
| 7       |   | Camouflage using available materials.   |    |   |   |      |   |   |
| 8       |   | Improve position as time permits.   |    |   |   |      |   |   |
| 9       |   | Muzzle end of Dragon must extend 6 inches beyond front trench.  |    |   |   |      |   |   |
| 10      |   | Rear end of Dragon must extend over rear of trench.   |    |   |   |      |   |   |
| 11      |   | Trench:<br>3 M16s long.   |    |   |   |      |   |   |
| 12      |   | Inverted V.   |    |   |   |      |   |   |
| 13      |   | Waist deep.   |    |   |   |      |   |   |
| 14      |   | Waist wide plus 6 inches.   |    |   |   |      |   |   |
| 15      |   | Front parapet:<br>1 M16 long.   |    |   |   |      |   |   |
| 16      |   | 1 M16 wide.   |    |   |   |      |   |   |
| 17      |   | 2 helmets high.   |    |   |   |      |   |   |
| 18      |   | Flank parapets:<br>Long enough to give good flank protection.   |    |   |   |      |   |   |
| 19      |   | 1 M16 wide.   |    |   |   |      |   |   |
| 20      |   | 2 helmets high.   |    |   |   |      |   |   |



| Taught? |   |   | Content  | GO |   |   | NOGO |   |   |
|---------|---|---|--|----|---|---|------|---|---|
| Y       | N | ? |  | 1  | 2 | 3 | 1    | 2 | 3 |
|         |   |   | Bipod trench:  |    |   |   |      |   |   |
| 21      |   |   | 2 sectors of fire trenches.  |    |   |   |      |   |   |
| 22      |   |   | 4 to 6 inches forward of main trench.  |    |   |   |      |   |   |
| 23      |   |   | 2 helmets long.  |    |   |   |      |   |   |
| 24      |   |   | 1 helmet wide.   |    |   |   |      |   |   |
| 25      |   |   | 6 inches deep.   |    |   |   |      |   |   |
|         |   |   | Grenade sump:  |    |   |   |      |   |   |
| 26      |   |   | Sloped forward at a 45 degree angle.   |    |   |   |      |   |   |
| 27      |   |   | 1 entrenching tool length deep.  |    |   |   |      |   |   |
| 28      |   |   | 1 entrenching tool blade in diameter.  |    |   |   |      |   |   |
| 29      |   |   | Floor of main trench should slope gently from ends to center and from rear to front. |    |   |   |      |   |   |
|         |   |   | Overhead cover:  |    |   |   |      |   |   |
| 30      |   |   | Large enough to provide protection for 1 man and extra rounds.                       |    |   |   |      |   |   |
| 31      |   |   | 12 inches deep.  |    |   |   |      |   |   |
| 32      |   |   | 18 inches over the side.   |    |   |   |      |   |   |
| 33      |   |   | 3 feet wide.   |    |   |   |      |   |   |
| 34      |   |   | 1 M16 wide, 2 M16 long.  |    |   |   |      |   |   |
|         |   |   | Fire from only 1 direction.  |    |   |   |      |   |   |
| 35      |   |   | Cover from all other directions.   |    |   |   |      |   |   |
| 36      |   |   | Concealment from all other directions.   |    |   |   |      |   |   |
| 37      |   |   | Should be covered from the front.  |    |   |   |      |   |   |
| 38      |   |   | Engage from the flank.   |    |   |   |      |   |   |

39 List other material taught, but not listed above.

Definition of terms:

- 41 Y/N Hasty position
- 42 Y/N Improved position
- 43 Y/N Parapet
- 44 Y/N Sump
  
- 44 Y/N The 10 minute time limit was enforced during practice.
- 45 Y/N The 10 minute time limit was enforced during testing.
- 46 Y/N Instructor used student handout as a training aid.
- 47 Y/N Instructor used other training aids (handouts, sketches).  
List:
  
- 48 Y/N Instructor asked if students had any questions.
- 49 Y/N There were student questions.  
List:
  
- 50 Y/N Critical points were stressed.  
If so, what?
  
- 51 Y/N Memory cues were used (how to remember dimensions).  
List:
  
- 52 Y/N Instructor called on each student during practice.
- 53 Y/N Instructor used the same terms throughout instruction.
- 54 Y/N Instructor emphasized sequence.
- 55 Y/N Instructor immediately corrected errors during practice.
- 56 Y/N Instructor gave initial demonstration of task.
- 57 Y/N Instructor talked student through initial demonstration of task.

**APPENDIX BB**

**STUDENT OBSERVATION FORM:  
CONSTRUCT A FIGHTING POSITION**

Student: \_\_\_\_\_ Observer: \_\_\_\_\_ Date: \_\_\_\_\_

### CONSTRUCT A FIGHTING POSITION FOR AN M47 MEDIUM ANTITANK WEAPON

Time practice/test started: \_\_\_\_\_

Time practice/test ended: \_\_\_\_\_

Number of practice/test trials: \_\_\_\_\_

Time received GO: 1 2 3 \_\_\_\_\_

| Content |   | GO |   |   | NOGO |   |   |
|---------|---|----|---|---|------|---|---|
|         |   | 1  | 2 | 3 | 1    | 2 | 3 |
| 1       | Dragon can be employed from hasty or improved positions.  |    |   |   |      |   |   |
| 2       | Fighting position is a firing position sited and oriented to cover a sector of fire constructed to accommodate the weapon system and firer. |    |   |   |      |   |   |
|         | After receiving a sector of fire and firing location:   |    |   |   |      |   |   |
| 3       | Prepare and position weapon to cover sector.  |    |   |   |      |   |   |
| 4       | Clear fields of fire (only what is necessary).  |    |   |   |      |   |   |
| 5       | Camouflage using available materials.   |    |   |   |      |   |   |
| 6       | Improve position as time permits.   |    |   |   |      |   |   |
| 7       | Muzzle end of Dragon must extend 6 inches beyond front trench.  |    |   |   |      |   |   |
| 8       | Rear end of Dragon must extend over rear of trench.   |    |   |   |      |   |   |
|         | Trench:   |    |   |   |      |   |   |
| 9       | 3 M16s long.  |    |   |   |      |   |   |
| 10      | Inverted V.   |    |   |   |      |   |   |
| 11      | Waist deep.   |    |   |   |      |   |   |
| 12      | Waist wide plus 6 inches.   |    |   |   |      |   |   |
|         | Front parapet:  |    |   |   |      |   |   |
| 13      | 1 M16 long.   |    |   |   |      |   |   |
| 14      | 1 M16 wide.   |    |   |   |      |   |   |
| 15      | 2 helmets high.   |    |   |   |      |   |   |
|         | Flank parapets:   |    |   |   |      |   |   |
| 16      | Long enough to give good flank protection.  |    |   |   |      |   |   |
| 17      | 1 M16 wide.   |    |   |   |      |   |   |
| 18      | 2 helmets high.   |    |   |   |      |   |   |
|         | Bipod trench:   |    |   |   |      |   |   |
| 19      | 2 sectors of fire trenches.   |    |   |   |      |   |   |
| 20      | 4 to 6 inches forward of main trench.   |    |   |   |      |   |   |
| 21      | 2 helmets long.   |    |   |   |      |   |   |
| 22      | 1 helmet wide.  |    |   |   |      |   |   |
| 23      | 6 inches deep.  |    |   |   |      |   |   |

| Content |  | GO |   |   | NOGO |   |   |
|---------|--|----|---|---|------|---|---|
|         |  | 1  | 2 | 3 | 1    | 2 | 3 |
|         | Grenade sump:  |    |   |   |      |   |   |
| 24      | Sloped forward at a 45 degree angle.   |    |   |   |      |   |   |
| 25      | 1 entrenching tool length deep.  |    |   |   |      |   |   |
| 26      | 1 entrenching tool blade in diameter.  |    |   |   |      |   |   |
| 27      | Floor of main trench should slope gently from ends to center and from rear to front. |    |   |   |      |   |   |
|         | Overhead cover:  |    |   |   |      |   |   |
| 28      | Large enough to provide protection for 1 man and extra rounds.                       |    |   |   |      |   |   |
| 29      | 12 inches deep.  |    |   |   |      |   |   |
| 30      | 18 inches over the side.   |    |   |   |      |   |   |
| 31      | 3 feet wide.   |    |   |   |      |   |   |
| 32      | 1 M16 wide, 2 M16 long.  |    |   |   |      |   |   |
|         | Fire from only 1 direction.  |    |   |   |      |   |   |
| 33      | Cover from all other directions.   |    |   |   |      |   |   |
| 34      | Concealment from all other directions.   |    |   |   |      |   |   |
| 35      | Should be covered from the front.  |    |   |   |      |   |   |
| 36      | Engage from the flank.   |    |   |   |      |   |   |

TEST ONLY:

- 37 Y/N Instructor asked leading questions to help student pass the test.
- 38 Y/N Would you have passed this student?
- 39 Y/N Instructor stopped student when a mistake was made.
- 40 Y/N Instructor told student he made a mistake, but student was allowed to continue with the task.
- 41 Y/N Other occurrences (unusual weather, unexpected instructor assignments)?

APPENDIX CC

INSTRUCTOR AND STUDENT OBSERVATION FORM:  
ENGAGE TARGETS WITH DRAGON TRAINING EQUIPMENT

## LET FIRING

### INSTRUCTOR PERFORMANCE ON INITIAL LET TRAINING

Date: \_\_\_\_\_

Instructor: \_\_\_\_\_

Observer: \_\_\_\_\_

[Observer: Circle appropriate answer]

#### Explain LET read-out

- |   |       |  |
|---|-------|--|
| 1 | Y/N/? | Hit/Miss score   |
| 2 | Y/N/? | Target range/off target setting readout - seconds and quadrant |
| 3 | Y/N/? | Gyro score   |
| 4 | Y/N/? | Other (fill-in) _____  |

#### Explain target scenario

- |   |       |  |
|---|-------|--|
| 5 | Y/N/? | Target speeds                                      |
| 6 | Y/N/? | Time of flight simulation                          |
| 7 | Y/N/? | Why stationary targets first                       |
| 8 | Y/N/? | Balance of left/right moving targets during firing |
| 9 | Y/N/? | Other (fill-in) _____                              |

#### Explain task

- |    |       |   |
|----|-------|---|
| 10 | Y/N/? | Cross hairs on center of mass (IR source) on target board |
| 11 | Y/N/? | Don't breathe   |
| 12 | Y/N/? | Review standing supported firing position                 |
| 13 | Y/N/? | Review sitting firing position                            |
| 14 | Y/N/? | Delay after trigger pulled, before charge goes off        |
| 15 | Y/N/? | Body position for moving targets (lean)                   |
| 16 | Y/N/? | Other (fill-in) _____                                     |

#### Explain team concept during LET training

- |    |       |  |
|----|-------|--|
| 17 | Y/N/? | Gunner   |
| 18 | Y/N/? | Safety; M64 cartridge; lift LET from gunner's shoulder |
| 19 | Y/N/? | LET plunger (weight reset)                             |
| 20 | Y/N/? | 4th member below for safety                            |
| 21 | Y/N/? | Other (fill-in) _____                                  |

# LET FIRING INSTRUCTOR AND STUDENT PERFORMANCE

Date: \_\_\_\_\_

Instructor: \_\_\_\_\_

Observer: \_\_\_\_\_

=====

Student: \_\_\_\_\_

Practice or Test (Circle)

Time Block Started: \_\_\_\_\_

Time Block Ended: \_\_\_\_\_

Target Scenario (Circle): Moving/Stationary

10/5/2 seconds

Firing Position: Standing supported / Sitting

[Observer - number the trial for each student and circle the appropriate answer.  
Circle any trial number when the LET was not charged.]

| #   | INSTRUCTOR    |      |               |      |                     |         |      |     | STUDENT |       |         |
|-----|---------------|------|---------------|------|---------------------|---------|------|-----|---------|-------|---------|
|     | <u>Before</u> |      | <u>During</u> |      | <u>LET Feedback</u> |         |      | H/M | <--     | Gyro  |         |
|     | Watch         | Fdbk | Watch         | Fdbk | H/M                 | Seconds | Gyro |     | -->     | Score |         |
|     | Gunr          |      | Gunr          | Gyro | (Quad)              |         |      |     | L-R     |       |         |
| ___ | Y/N           | Y/N  | Y/N           | Y/N  | Y/N                 | Y/N     | Y/N  | Y/N | H/M     | ---   | ___/___ |
| ___ | Y/N           | Y/N  | Y/N           | Y/N  | Y/N                 | Y/N     | Y/N  | Y/N | H/M     | ---   | ___/___ |
| ___ | Y/N           | Y/N  | Y/N           | Y/N  | Y/N                 | Y/N     | Y/N  | Y/N | H/M     | ---   | ___/___ |
| ___ | Y/N           | Y/N  | Y/N           | Y/N  | Y/N                 | Y/N     | Y/N  | Y/N | H/M     | ---   | ___/___ |
| ___ | Y/N           | Y/N  | Y/N           | Y/N  | Y/N                 | Y/N     | Y/N  | Y/N | H/M     | ---   | ___/___ |
| ___ | Y/N           | Y/N  | Y/N           | Y/N  | Y/N                 | Y/N     | Y/N  | Y/N | H/M     | ---   | ___/___ |
| ___ | Y/N           | Y/N  | Y/N           | Y/N  | Y/N                 | Y/N     | Y/N  | Y/N | H/M     | ---   | ___/___ |

Y / N Instructor coached the student during LET qualification.

COMMENTS: (e.g., student problems, instructor comments, special interactions between instructor and student, variation in training procedures, etc.)



## Key to LET Observation Form

### INSTRUCTOR:

# = Sequence number of round fired.

#### Before

Watch Gunr = Did the instructor watch the student before the shot, when preparing to fire?

Fdbk = Did the instructor give the student feedback when preparing to fire?

#### During

Watch Gunr = Did the instructor watch the student after the LET was fired, when the target was being tracked?

Feedbk Gunr = Did the instructor give the student feedback about firing position during the track?

Feedbk Gyro = Did the instructor give the student feedback about aiming during the track based on the indicator meter reading?

#### LET Feedback

H/M = Did the instructor tell the student "hit" or "miss"?

Seconds = When the student received a miss, did the instructor tell the student during which second of flight the error was made?

Gyro = Did the instructor tell the student the final indicator meter score?

### STUDENT:

H/M = Did the student hit or miss the target?

<--

--> = In which direction was the vehicle traveling?

L-R

Gyro Score = What was the indicator meter score (horizontal/vertical readings)?